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KANSAS DEPARTMENT OF AGRICULTURE
DIVISION OF WATER RESOURCES

RE: CITY OF WICHITA'S APPLICATIONS TO APPROPRIATE WATER
TO OPERATE AN AQUIFER STORAGE AND RECOVERY PROJECT
IN HARVEY COUNTY, KANSAS

TRANSCRIPT OF PROCEEDINGS

Transcript of public hearing held at the
Kansas Cosmosphere and Space Center, 1100 Plum Street,
Hutchinson, Kansas, commencing at 8:10 a.m., on Tuesday,
December 21, 2004, before Hearing Officer David L. Pope,
Chief Engineer, James O. Bagley and Leland E. Rolfs of
the Kansas Department of Agriculture, reported by
Michelle D. Hancock, Certified Shorthand Reporter within
and for the state of Kansas.

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LEGAL SECTION
KS DEPT. OF AGRICULTURE

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HEARING OFFICER POPE: Please come to order. My name is David Pope, Chief Engineer and Director of the Division of Water Resources, Kansas Department of Agriculture. I will serve as hearing officer for this matter. It is approximately 8:10 a.m. on Tuesday, December 21st, 2004. We're meeting at the Kansas Cosmosphere and Space Center at 1100 North Plum Street, Hutchinson, Kansas. This hearing is on the matter of the city of Wichita's proposed aquifer storage and recovery program in Harvey County, Kansas and is being held as required by Kansas Administrative Regulation 5-12-3. This hearing will include a formal portion which we will begin here in a few minutes, or are beginning now, and a less formal portion to allow for public comments this evening, which I will describe in more detail here in a few minutes.

At this time I would like the attorneys who are here representing the formal parties in this case to enter their appearances for the record, please, for the applicant.

MR. LANG: For the city of Wichita, Joe Allen Lang and Jay Hinkle.

HEARING OFFICER POPE: Okay. Thank you. And for the Groundwater Management District?

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MR. ADRIAN: I'm Tom Adrian, and I'm representing the Equus Beds Groundwater Management District Number 2.

HEARING OFFICER POPE: Okay. Thank you. Notice of this public hearing was sent by regular mail to the parties, water right owners and water use correspondents of record in the office of the chief engineer that are located in the vicinity of the proposed wells and to individuals who had requested to be notified of the hearing. Notice was also published in the Hutchinson News and the Wichita Eagle on or about December 10, 2004. Subsequent to the process -- subsequent to the receipt and then processing of the applications for permit to appropriate water, the proceeding that we're -- that led up to today's hearing began with a notice of a prehearing conference on or about September 3rd of 2004, and that notice resulted in a prehearing conference, identification of the formal parties, which are city of Wichita as the applicant, and the Equus Beds Groundwater Management District, and then the issuance of two prehearing orders, along with other pleadings that were filed by the parties. And that -- that process essentially outlined the primary issues of concern in this case

1 as well as the witnesses and hearing procedures and
2 the exchange of exhibits that will be referred to
3 here later today.

4 We'll be circulating an attendance sheet and
5 we'd like for everyone present here today to sign
6 that attendance sheet. There will also be one at
7 back table, if you have signed there, or otherwise
8 can send the one around.

9 Now, these recordings, as you have observed
10 here, are being recorded by a court reporter. Each
11 witness will be sworn by the court reporter. Would
12 ask that everyone speak clearly so that the court
13 reporter can hear. And we also need each person to
14 only speak one at a time, or people to only speak
15 one at a time so that the court reporter can
16 accurately record your testimony. Please also speak
17 into the microphone when that is appropriate so that
18 the audience can hear you. The hearing will begin
19 with the parties, again, the city of Wichita and the
20 Equus Beds Groundwater Management District Number 2,
21 making their formal presentations. The city is a
22 party by virtue of being the applicant, and the
23 district was granted party status as a result of the
24 prehearing process that was referred to earlier.
25 The public comment portion of this hearing will

1 begin in this room at 7:00 p.m. this evening. If
2 the formal hearing is not complete today, it will
3 then be reconvened tomorrow at this location in
4 accordance with my direction at the conclusion of
5 the formal hearing today. We'll make every attempt
6 to finish the public comment portion of this hearing
7 this evening, but if we are not able to do that,
8 why, then we'll make appropriate arrangements.

9 I do want to encourage everyone that's
10 interested in this matter to provide public comments
11 at the appropriate time or we may receive written
12 comments at any time. The record has been opened
13 for that already as a result of the notice and some
14 of you have already started providing written
15 comments, and that's certainly acceptable any time
16 during the course of this proceeding.

17 Now, the general purpose of this hearing is to
18 consider whether the city of Wichita's new
19 applications to appropriate water, which are file
20 numbers 45,567, 455,568, 45,569, 45,570, 45,571,
21 45,572, 45,573, 45,574, 45,575, 45,576 and 46,081
22 should be approved, denied or modified. The general
23 test for approving new applications is whether or
24 not they will impair a use under an existing water
25 right or prejudicially and unreasonably affect the

1 public interest.

2 These new applications to appropriate water
3 have been filed by the city of Wichita under the
4 provisions of the Kansas Water Appropriation Act,
5 that's K.S.A. 82a-701 et seq., and particularly
6 regarding 82a-711, for purposes of appropriating the
7 high flows from the Little Arkansas River by means
8 of seven proposed bank storage wells withdrawing
9 water along the west bank of the Little Arkansas
10 River in Section 8, Township 23 South, Range 2 West,
11 Harvey County, Kansas, and located generally in an
12 area between two and three miles upstream of U.S.
13 Highway 50 bridge over the Little Arkansas River.
14 The water will be treated and injected -- it's
15 proposed that the water will be treated and injected
16 into the equus beds aquifer by means of four
17 recharge wells, and those are located in Sections
18 12, 23, 24 and 36 in Township 23 South, Range 3
19 West, Harvey County, Kansas, and located generally
20 on a line approximately three miles east of Burrton
21 from about a mile south of Highway 50 to just over
22 two miles north of the highway. The water is
23 proposed to be then later withdrawn for municipal
24 use by means of the same recharge wells.

25 The purpose of the formal hearing is to

1 receive evidence and testimony about the proposed
2 project, including the following: The method by
3 which surface water will be withdrawn from the
4 Little Arkansas River, the process for treating and
5 recharging it into the equus beds aquifer, and the
6 accounting system that the city of Wichita will use
7 to determine how much of the water that has been
8 recharged into the aquifer may be withdrawn, and if
9 the applications are approved, any terms and
10 conditions that will need to be placed on the
11 permits to prevent impairment and prevent the
12 project from prejudicially and unreasonably
13 affecting the public interest.

14 Now, the purpose of the public hearing comment
15 portion this evening at the -- for this hearing this
16 evening at 7:00 p.m. tonight is to receive comments
17 from any member of the public concerning the
18 proposed project. We recognize that there are
19 people interested in this hearing that are not
20 represented by one of the formal parties. There are
21 cards available at the back table, and anyone who
22 would like to comment at the public hearing this
23 evening, would ask that you please fill one of the
24 cards out and turn them in to one of our staff
25 members. Testimony may be made orally, submitted in

1 writing, or both. If there are a large number of
2 persons wishing to comment, we reserve the right to
3 impose a time limit.

4 I might note that the Division of Water
5 Resources staff will not be providing testimony for
6 or against these applications, but Mr. Rolfs here,
7 Mr. Leland Rolfs located to my right, as legal
8 counsel for me as chief engineer, will be allowed to
9 call witnesses for the limited purpose of
10 introducing documentation from the agency files
11 pertaining to these applications. And I might also
12 note that to my left is Mr. Jim Bagley. And during
13 the course of the proceedings I will allow them also
14 to ask questions of the witnesses.

15 Before we start, let me ask counsel for the
16 parties if there are any procedural questions or
17 preliminary matters that need to be raised by
18 counsel before we begin, we could do that at this
19 time.

20 MR. ADRIAN: Yes, Mr. Pope, we have
21 prepared -- the district has prepared a response to
22 the motion to amend the application. We have
23 provided that to Mr. Hinkle I think electronically
24 yesterday and so he has had access to it since then,
25 and I have several originals here that I would like

1 understood the last point. Can you say that again.

2 MR. HINKLE: That the witnesses be
3 allowed to use their notations, the notes that they
4 have, to aid their testimony without being
5 challenged as it would be in a court of law, for
6 example.

7 HEARING OFFICER POPE: Any objection to
8 that?

9 MR. ADRIAN: No objection.

10 MR. HINKLE: And, thirdly, the city as
11 applicant has listed Mr. Dealy as a witness. We
12 think that his testimony would probably best be
13 presented through the district, and we would ask
14 simply to allow the city's case to remain open
15 pending the testimony of Mr. Dealy, and if there are
16 any questions that we would have of him afterwards
17 that we be allowed to present those questions and be
18 considered as part of the city's case.

19 HEARING OFFICER POPE: Okay. Mr. Adrian.

20 MR. ADRIAN: Yes. I have no objection to
21 that. In fact, the procedure that you've set out
22 allows for in fact rebuttal testimony, and so I
23 don't -- there would certainly be no merit in
24 disagreeing with that, so....

25 HEARING OFFICER POPE: Okay. I think --

1 to present to you at this time, at least one.

2 HEARING OFFICER POPE: Okay. That would
3 be fine, and I take it you'll be addressing that
4 during some of your testimony, then.

5 MR. ADRIAN: That's correct.

6 HEARING OFFICER POPE: Okay. Thank you.
7 The city.

8 MR. HINKLE: Yes, Mr. Pope. I have three
9 items I'd like to ask your attention on. First is
10 for both parties there are witnesses who have
11 prepared their testimony to be presented with the
12 use of Power Point equipment, and we have the
13 facilities available to use those, and I would ask
14 that they be allowed to do so with a minimum of
15 questioning to interrupt that process. I think that
16 would be illustrative both for the public and for
17 you and your staff. The parties have exchanged
18 those Power Points so we have -- we know what is
19 going to be presented and have an opportunity to
20 address those. The second is, since written
21 comments can be presented as testimony, I would ask
22 that the witnesses be allowed to use notes that they
23 have prepared in aid of their testimony so that they
24 can have it be as complete as possible.

25 HEARING OFFICER POPE: I'm not sure I

1 I think that will be fine, Mr. Hinkle. With regard
2 to the Power Point presentations, if I understand
3 you right, you would still have all of the other
4 documentations as exhibits which would be the record
5 of the case, and you simply are offering the Power
6 Points as a way to explain the testimony in an
7 organized way going through this procedure.

8 MR. HINKLE: Absolutely. I don't believe
9 there's anything contained in any Power Point that
10 isn't already a part of the record, but it seems to
11 me like -- that the witnesses, having prepared the
12 Power Point presentations with what they feel are
13 the most pertinent exhibits, that presentation in
14 that form in a fluid fashion would be the best way
15 to explain the issues that are involved.

16 HEARING OFFICER POPE: I think that's
17 probably acceptable, unless there's objection. I
18 think it sounds -- Mr. Adrian, do you have any
19 comments on that, or do you have something planned
20 as well?

21 MR. ADRIAN: Well, we have Power Point
22 presentations as Mr. Hinkle mentioned, and we feel
23 that a free flow of that information is best brought
24 about by utilizing them in the manner he described,
25 so we certainly have no objection.

1 HEARING OFFICER POPE: My objective here
2 is just to have a complete, fair proceeding where
3 all the information can be presented and understood
4 properly, so I don't believe there's any reason to
5 object to that process as compared to a very more --
6 more detailed question and answer throughout the
7 whole thing, so without objection we'll go ahead and
8 allow that. I would ask that, even though we will
9 anticipate a number of exhibits being introduced,
10 that -- that the Power Point presentations
11 themselves be made available. Is there any reason
12 why that cannot be done?

13 MR. ADRIAN: No, Your Honor, and we have
14 those -- Your Honor. Excuse me. Mr. Pope.

15 HEARING OFFICER POPE: You don't need to
16 say Your Honor.

17 MR. ADRIAN: I wasn't going to allow that
18 to happen. His holiness, yes.

19 HEARING OFFICER POPE: It's getting
20 worse.

21 MR. ADRIAN: Anyway, we have copies
22 available here to distribute. And as a general
23 comment, my impression of this hearing was that we
24 were to facilitate a free flow of information to
25 you, not to be constrained by strict rules of

1 don't necessarily see that that's going to be a
2 problem, and we will have those available for
3 reference as needed. I will indicate that in terms
4 of our -- while this is an administrative proceeding
5 and the formal rules of procedure for a court case
6 would not need to apply, I would -- I will be asking
7 counsel, if they have objections to any of the
8 particular exhibits, and if you do, why, you of
9 course would need to state the basis for that before
10 I would rule on the admission of exhibits, but again
11 we have some latitude in an administrative hearing
12 in terms of being able to sort through what's -- can
13 be relied upon.

14 I believe that it was indicated in the
15 prehearing order that each party would be allowed to
16 make a brief opening statement -- and excuse me. If
17 you would each like to make a brief opening
18 statement we can allow it at this time. If you
19 don't need to do that and want to proceed on to the
20 hearing testimony, we can do that as well.

21 MR. LANG: Thank you, Mr. Pope. Joe Lang
22 for the city of Wichita. I'll stand up here in
23 front of you at the podium, a little easier for me
24 to read my notes, and would like to present just a
25 brief overview of the case the city of Wichita will

1 evidence that we would normally play by in a court
2 of law.

3 HEARING OFFICER POPE: This is an
4 administrative hearing and even though we're holding
5 it in a fairly formal fashion to ensure that the
6 evidence is properly presented in regard to any
7 questions or objections, I certainly do want the
8 free flow of information. I simply want to
9 understand. My goal here is to make sure that I
10 understand this project so we can make the best
11 possible decision. If -- so as long as there's not
12 a concern about -- I think it would be appropriate
13 as long as we simply have copies of the Power Point
14 information and can refer to those later if
15 necessary for the record. Is that acceptable?

16 MR. HINKLE: That's certainly acceptable.
17 Mr. Pope, witnesses have just reminded me that
18 actually there are a couple of items that are
19 demonstrative -- intended as demonstrative exhibits
20 within the Power Point presentations that are not
21 part of the record, and I didn't want to mislead you
22 that everything in the Power Point presentations are
23 contained in the record at this point.

24 HEARING OFFICER POPE: If they're
25 illustrative type -- demonstrative type things, I

1 make today in support of its application to operate
2 an aquifer storage and recovery project in the equus
3 beds and specifically in Harvey County.

4 I think it will become clear also through our
5 testimony that this -- these applications reflect
6 phase one of a -- of a much larger project. Long
7 before the applications for these permits to
8 appropriate water were filed the city of Wichita and
9 its consultants were working on a water supply plan
10 to meet the future needs of the citizens of Wichita
11 and South Central Kansas. One potential solution
12 that came out of that study was the aquifer storage
13 project, which you and your staff are quite
14 familiar. After years of extensive design and
15 study, the result was the permit applications to
16 appropriate water through a system of bank storage
17 wells and recharge wells. The genesis and
18 development of this plan will be presented by our
19 witnesses, David Warren, the director of water and
20 sewer for the city of Wichita; and Jeffrey Klein,
21 who is a project manager for Burns & McDonald. The
22 development of the plan and the permitting process
23 consistent with the aquifer storage and recovery
24 regulations in K.A.R. 5-12-1 and others will be laid
25 out by Jerry Blain who is the city's water supply

1 projects administrator. Also we have asked Andy
 2 Ziegler, a hydrologist and water quality specialist
 3 from the USGS, to describe the USGS role in this
 4 study and to present a number of exhibits that the
 5 city used in the application that were prepared by
 6 USGS. And, finally, David Stous of Burns & McDonald
 7 who's a hydrogeologist will explain the model that
 8 was developed and used and he will also explain and
 9 demonstrate the aquifer storage and recovery
 10 accounting system as set out in the regulations and
 11 as the -- as your issues have asked us to address.

12 We hope that this will show the study process
 13 leading to the applications was carefully planned
 14 and executed. It was and still is being constantly
 15 refined to reflect both the engineering
 16 understanding and the comments and concerns of the
 17 landowners and residents and the public in the area.
 18 Through this process the city of Wichita and the
 19 Groundwater Management District Number 2 have
 20 entered into a Memorandum of Understanding, which is
 21 in the record, where these parties have reached an
 22 agreement to reflect the need for thorough and
 23 continued study and refinement. An important
 24 element of the Memorandum of Understanding and the
 25 GMD's support for the project is the city's

1 commitment to periodically review and discuss and
 2 modify as needed this plan.

3 The evidence we are presenting today is
 4 specifically tailored to address the issues that you
 5 have raised in the eight issues in the Memorandum of
 6 Understand -- or in the prehearing order.

7 And finally, we believe that the exhibits on
 8 file and the supporting testimony today will address
 9 the requirements of K.A.R. 5-12-1 for an aquifer
 10 storage permit as well as the general requirements
 11 of K.S.A. 82a-711 for appropriation of water for
 12 beneficial use.

13 The applications are in the record and of
 14 course take up quite a bit of the division's record
 15 in this case. We will try to sort out as we go
 16 through the hearing, unfortunately we lettered our
 17 exhibits in the same fashion as the Division of
 18 Water Resources lettered its exhibits, so we will
 19 refer to our exhibits as city of Wichita exhibits.
 20 But these applications are in the record, and for
 21 conditions that might be placed on them, these are
 22 addressed by the Memorandum of Understanding, and
 23 with the additional comments that were received from
 24 the Groundwater Management District yesterday
 25 evening.

1 In conclusion, Mr. Pope, it is submitted that
 2 the procedures under the application neither impair
 3 use under an existing water right nor prejudicially
 4 or unreasonably affect the public interest and that
 5 we feel confident that the applications should be
 6 approved. Thank you. We will proceed with our
 7 testimony now, if you're ready.

8 HEARING OFFICER POPE: Let me get opening
 9 comments from the district and then we'll proceed
 10 from there.

11 MR. ADRIAN: If you don't mind, I'll
 12 remain at my table here. At first I would like
 13 to -- again, I'm Tom Adrian representing the Equus
 14 Beds Groundwater Management District. First I'd
 15 like to note that the district is governed by a
 16 nine-member board who are elected by qualified or
 17 eligible voters within the district. It is a
 18 locally managed district that was formed in 1974 and
 19 has been operating since that time. It primarily
 20 governs initially about a 500,000 acre area over
 21 Central Kansas, South Central Kansas, later to be
 22 expanded to approximately a million acres. It has a
 23 very intense interest in this project, and I think
 24 as will be -- or has been demonstrated by the
 25 filings and the recommendations and the other items

1 that Mr. Lang mentioned, it has considerable input
 2 into this ultimate decision. But preliminarily I'd
 3 like to mention that we have a number of board
 4 members present. Bob Seiler, obviously who will be
 5 a witness, is seated with me at the table. He's
 6 president of the board. Frank Harper is in the
 7 audience. He's the vice president. Mark Whitson is
 8 here also, who is treasurer of the board. Jerry
 9 Blain who's a member of the board and serves the --
 10 really the dual role as a representative of the city
 11 of Wichita and a member of the board. Clarke Dixon
 12 is a member of the board and is present in the
 13 audience as is Nadine Stannard. We appreciate their
 14 interest and their attendance today. I think it
 15 demonstrates the feelings that the board has with
 16 regard to this project and protection of water in
 17 general.

18 We're going to be calling three witnesses.
 19 Probably in reality we -- they are not going to be
 20 saying anything that is not already in the record.
 21 We have submitted the recommendations of the
 22 district, which as you recognize are extensive.
 23 Those recommendations have been modified by a
 24 Memorandum of Understanding which has already been
 25 referred to, and that memorandum was brought about

1 following a hearing the district held in which the
2 city and the district and the district's consultant
3 and manager sat down to consider other issues which
4 might relate to these applications and came to an
5 understanding which was reduced to writing in that
6 memorandum.

7 In addition to that, to those recommendations,
8 we feel that they have presented to you the position
9 of the district, which is ultimately, as is your
10 goal, the protection of the public interest in
11 regard to this.

12 I would note for you that the district
13 unanimously passed its recommendation back to the
14 chief engineer after consideration of the
15 applications. That, as I said earlier, they have
16 reviewed the new applications which were submitted
17 and have submitted recommendations to you, so all of
18 that is in writing. As I said, Mr. Seiler will be a
19 witness. The first witness that we will call will
20 be Mike Dealy to review his recommendations. He's
21 manager of the district. We've -- he and I visited
22 yesterday, and I emphasized that there is merit in
23 brevity, and so we will attempt to go through those
24 recommendations, although they are extensive, go
25 through them as rapidly as possible.

1 like to call Mr. William Gilliland to the stand,
2 please.

3 WILLIAM JAMES GILLILAND,
4 called as a witness, having been first duly
5 sworn, testified as follows:

6 DIRECT EXAMINATION

7 BY MR. ROLFS:

8 Q You can turn on that lavalier mic there.

9 Could you state your full name for the record,
10 please.

11 A William James Gilliland.

12 Q And what is your position today?

13 A I'm the permits unit supervisor.

14 Q For what agency?

15 A Division of Water Resources.

16 Q And generally what are your duties in that position?

17 A I supervise the processing of new and change
18 applications that are filed with the division.

19 Q And the applications Mr. Pope has described today
20 submitted by the city of Wichita, those come to you,
21 is that correct?

22 A That is correct.

23 Q Now, generally what type of documents have been
24 submitted in this matter?

25 A There were the original applications that were

1 The second witness that we will call is Carl
2 Nuzman. Carl will recite for you his qualifications
3 to speak, but he is a special consultant. He's been
4 hired by the district to review these applications
5 and advise the district and this board. He was
6 instrumental in formulating the Memorandum of
7 Understanding that you have seen.

8 And then last -- the last witness we will call
9 is Bob Seiler who will talk about the process that
10 the citizen board went through in its efforts to
11 make relevant and important recommendations to you
12 and protect the public interest.

13 We appreciate this opportunity to present
14 this -- our position to you and hope that it will be
15 productive and helpful. Thank you.

16 HEARING OFFICER POPE: Okay. Thank you
17 both. Before I ask the city to begin their case,
18 I'm going to ask Mr. Rolfs to call -- is it just one
19 witness, for the Division of Water Resources, and I
20 think that will be only for the purpose of the
21 documentation from the files of the Division of
22 Water Resources which I think have already been
23 provided, but let me take it from there in regard to
24 the presentation of that.

25 MR. ROLFS: Thank you, Mr. Pope. I'd

1 submitted to the division. There were also reports
2 submitted by the applicant and the Groundwater
3 Management District. They're included in the files.
4 Other documents related to the processing up to this
5 point, including public comment letters that had
6 been returned from initial notification of those in
7 the area of the applications and also the
8 recommendations of Groundwater Management District
9 and the Memorandum of Understanding.

10 Q Have you prepared or had prepared copies of these
11 exhibits?

12 A I assisted in the preparation of them, yes.

13 Q And what exhibits are they known as?

14 A They're exhibits in the binders over here on the
15 table, I believe Exhibits A through Z.

16 Q Those are the Division of Water Resources Exhibits A
17 through Z?

18 A Yes, they are.

19 Q Did we receive any objections to these exhibits --
20 they were furnished to the parties prior to this
21 proceeding, were they not?

22 A Yes, they were.

23 Q And did we receive any objections from either of the
24 parties concerning the admission of these exhibits
25 into the record?

1 **A No, we did not.**
 2 MR. ROLFS: And I did not receive any
 3 objections either prior to this time. I would ask
 4 that Exhibits A through Z, the Division of Water
 5 Resources exhibits, be admitted as part of the
 6 record in this hearing.
 7 HEARING OFFICER POPE: Let me double
 8 check with the parties. For the city, you didn't
 9 have -- you had already stipulated to them, as I
 10 recall.
 11 MR. HINKLE: That's correct.
 12 HEARING OFFICER POPE: And the district?
 13 MR. ADRIAN: Yes, we have.
 14 HEARING OFFICER POPE: With that, DWR
 15 Exhibits A through Z will be admitted to the record.
 16 Q Mr. Gilliland, do you have a file containing the
 17 notice that were given of the prehearing conference
 18 and of this hearing?
 19 **A Yes, I do.**
 20 MR. ROLFS: And I would like that
 21 denominated Division of Water Resources Exhibit AA,
 22 and I would ask that that be admitted as part of the
 23 record of this hearing also.
 24 HEARING OFFICER POPE: Any objection?
 25 MR. HINKLE: (Shook head back and forth.)

1 HEARING OFFICER POPE: These are simply
 2 the notice of the prehearing conference and this
 3 hearing itself.
 4 MR. ADRIAN: No objection.
 5 MR. HINKLE: No objection.
 6 HEARING OFFICER POPE: With that, DWR
 7 Exhibit AA, these notices, will be admitted as part
 8 of the record. With that, I don't believe there's
 9 any -- we didn't -- Mr. Gilliland was not called for
 10 substantive testimony about these, so I assume
 11 there's no need for any further involvement of him.
 12 Mr. Gilliland, thank you. You may step down.
 13 With that, Mr. Lang, you may begin your case.
 14 MR. LANG: And Mr. Hinkle will begin.
 15 MR. HINKLE: Mr. Pope, would you like me
 16 to use that microphone or --
 17 HEARING OFFICER POPE: I think that would
 18 be better.
 19 MR. HINKLE: And would you prefer me to
 20 be at the table or podium?
 21 HEARING OFFICER POPE: Whichever works
 22 the best for you.
 23 MR. HINKLE: All right.
 24 The city of Wichita calls as its first witness
 25 Mr. David Warren.

1 DAVID R. WARREN,
 2 called as a witness, having been first duly
 3 sworn, testified as follows:
 4 DIRECT EXAMINATION
 5 BY MR. HINKLE:
 6 Q Mr. Warren, would you please identify yourself and
 7 state your position with the city of Wichita.
 8 **A My name is David R. Warren. I'm the director of the**
 9 **water and sewer department for the city of Wichita,**
 10 **Kansas.**
 11 Q How long have you been so employed?
 12 **A I've been the director since May of 1989.**
 13 Q Does your position include the evaluation and
 14 planning for future water consumption needs for the
 15 city of Wichita?
 16 **A Yes, it does.**
 17 Q How were you first involved in that process?
 18 **A First involvement in the process goes back to**
 19 **shortly after my employment by the city, a review of**
 20 **the city's involvement in the public wholesale water**
 21 **supply district number 10 which was a number of**
 22 **cities generally lined up along I-135 from Wichita**
 23 **to Salina who had joined together to jointly seek a**
 24 **beneficial use and transfer of water from Milford**
 25 **Reservoir for the use by the member cities.**

1 Q Was that -- excuse me. Out of that process was
 2 there a particular document generated with
 3 alternatives evaluated?
 4 **A There were some alternatives that were evaluated,**
 5 **but generally the process involved Milford Reservoir**
 6 **and the treatment of water at Milford and then**
 7 **distribution of treated water to the various member**
 8 **cities.**
 9 Q Does the term water supply plan have significance to
 10 you?
 11 **A Yes.**
 12 Q And did that relate to this particular project?
 13 **A Yes, it does.**
 14 Q And what was that?
 15 **A In regard to the city's involvement, it became**
 16 **fairly clear to me and to my staff as we reviewed**
 17 **the recommendations that had been made regarding the**
 18 **Milford project that Wichita had not singly and for**
 19 **itself looked at all options that it might consider**
 20 **other than this Milford option. It was my belief**
 21 **that it was both prudent and necessary for the city**
 22 **to proceed to review its water supply requirements**
 23 **as an entity in and of itself. Wichita represented**
 24 **well over half the interest in this group of cities**
 25 **that had banded together. I also believe that**

1 politically, environmentally, and from a regulatory
2 standpoint, it would be extremely difficult and
3 fraught with a considerable amount of tension and
4 argument to do an interbasin transfer of water from
5 Milford to Wichita and these other member cities.

6 I felt that in the city's best interests the
7 city should proceed to do a comprehensive water
8 supply study on the basis of its own needs.

9 Q And so the city did proceed to do that?

10 A Yes, the city did. The city engaged the consulting
11 firm of Burns & McDonald out of Kansas City to
12 undertake a water supply study, and this was done in
13 1992.

14 Q Just generally, were there a number of different
15 alternatives that were considered besides the
16 Milford option?

17 A There were over 27 alternatives that the engineers
18 and the city staff looked at in working through that
19 process. Those included everything from the Milford
20 project to construction of new water reservoirs to
21 diversion of water from the Ark River and other
22 water bodies to the integrated local water supply
23 plan which was ultimately decided upon as the
24 direction the city would take.

25 Q How did the city first put into testing the

1 alternative it had chosen?

2 A Once we had decided upon an integrated local water
3 supply plan -- and that plan included a number of
4 elements, and the aquifer storage and recovery
5 project was but one of those elements, and at that
6 time the city was considering a maximum 150 million
7 gallon a day project which would have included
8 100 million gallons a day of bank storage diversion.
9 The city, recognizing that such an undertaking had
10 not been done in the state of Kansas before,
11 believed that it was, again, prudent and necessary
12 that the city look at this project very carefully
13 before proceeding, that there was a tremendous
14 number of interests outside of just the city's
15 interest with regard to a project of this nature,
16 and the city sought from the very beginning input
17 from the public, from the regulatory agencies, input
18 with regard to how this demonstration project should
19 be put together and monitored and developed in order
20 to address those needs and to include those needs
21 and considerations in any final design or
22 application for beneficial water use.

23 Q Were there other specific sponsoring agencies for
24 this demonstration project?

25 A There were a number of agencies that had a direct

1 interest in the project other than the city: The
2 Groundwater Management District Number 2 was one of
3 those, United States Bureau of Reclamation, United
4 States Geological Survey, and the United States
5 Environmental Protection Agency, to name some of
6 them.

7 Q Before we leave it, you have described the aquifer
8 storage recovery as one aspect of the water plan.
9 What other aspects of the water plan did the city
10 choose to implement at some point?

11 A Other aspects of the plan included water
12 conservation considerations. The city implemented a
13 very aggressive water rate structure that is
14 referred to in our industry as base extra capacity
15 type of rate structure or inverted block rate
16 structure. In such a rate structure, the customer
17 is penalized with a price signal, if you will, for
18 using water above a certain factor during peak
19 periods, usually those periods that are associated
20 with irrigation activities. We believe that based
21 on our historical demands prior to the
22 implementation of this type of rate structure and
23 current demands that we are seeing and the growth of
24 those demands, that that's had a very significant
25 impact on customer use patterns, particularly during

1 peak periods. We also looked at a change in our
2 emphasis with regard to our various water supplies
3 which placed a greater emphasis on Cheney Reservoir,
4 our surface water supply, and using that water
5 supply, if you will, as a first alternative for
6 water supply for the city, because by nature the
7 reservoir goes through fill and drain cycles that
8 are related to weather patterns, and the groundwater
9 formation is not nearly as impacted by those
10 patterns, and we felt like it was important that
11 during those periods of time when the surface water
12 supply was available that we take maximum advantage
13 of this and allow the equus beds to remain in
14 reserve, if you will, for those periods of time when
15 the surface water reservoir would not be so readily
16 available, such as might occur during a drought.

17 Public education. We have done public
18 education via printing materials that go out in the
19 water bills, via television ads that the city has
20 paid for, radio ads that the city has paid for,
21 public speaking engagements. All of these factors,
22 if you will, were part of that integrated local
23 water supply plan that the city adopted.

24 Q Did you seek any kind of independent review or
25 establish some type of panel review for the

1 demonstration project?
 2 **A There's been significant review of this project. I**
 3 **would dare to say that this may be the most reviewed**
 4 **project the state of Kansas has ever seen. In**
 5 **addition to oversight from regulatory agencies,**
 6 **including the Division of Water Resources and**
 7 **others, the city on its own asked the American Water**
 8 **Works Association to assist the city in putting**
 9 **together a blue ribbon panel of national experts,**
 10 **people from both academia and from the water works**
 11 **industry who are familiar with aquifer storage and**
 12 **recovery and water supply type of projects to come**
 13 **together and review the city's projects. These**
 14 **experts were then brought to Wichita for a couple of**
 15 **days. Mr. Rob Renner, who was then a deputy a**
 16 **director of the American Water Works Association,**
 17 **was brought in to facilitate that process. And**
 18 **these experts reviewed the city's documentation and**
 19 **history of the project, the demonstration project**
 20 **results, and provided the city with recommendations**
 21 **with regard to the project.**

22 **And essentially the outcome of that blue**
 23 **ribbon panel review was that the city should proceed**
 24 **with the project. They also recommended the city**
 25 **look deeper into, as part of the project, membrane**

1 **type of technologies, and the city has done that as**
 2 **well, but that was one. The Groundwater Management**
 3 **District of course hired Mr. Nuzman as an**
 4 **independent expert to also review the project and**
 5 **provide recommendations, which he did. And those**
 6 **are part of the record. Dr. Herman Bauer, who is by**
 7 **many considered the grandfather of aquifer recharge**
 8 **projects in the United States was also asked to**
 9 **review the project and did so and provided a letter**
 10 **which is also included in the record.**

11 **Q And by way of cross-reference, we would just note**
 12 **that Dr. Bauer's letter appears in the record as**
 13 **City's Exhibit letter C, for example?**

14 **A That's correct.**

15 **Q That review took place, or at least began in 2001,**
 16 **is that correct?**

17 **A It was done and completed in July of 2001, that's**
 18 **correct.**

19 **Q All right. And did that -- what part did that play**
 20 **or was that related to the next phase, the design**
 21 **phase of the project?**

22 **A Well, certainly some of the recommendations that we**
 23 **received from the input from that blue ribbon panel**
 24 **resulted, one, in another study of membrane**
 25 **technologies for water treatment for the city. It**

1 **also resulted in the city modifying the 150 million**
 2 **gallon a day project to a 100 million gallon a day**
 3 **project. And, again, as was stated in the opening**
 4 **by Mr. Lang, the city has continuously refined this**
 5 **project as time has gone forward. What brought us**
 6 **here today is a process that has spread out over**
 7 **more than 12 years. It's not something that**
 8 **happened yesterday. The city has considered this**
 9 **thoughtfully and carefully before bringing this to**
 10 **the point of making these applications. I believe**
 11 **that as a result of, again, ongoing work and study**
 12 **that the city and its consultants have done,**
 13 **ultimately we arrived at a project which is now**
 14 **predominantly going to be driven by surface water**
 15 **recharge from the Little Arkansas River as opposed**
 16 **to bank storage type of facilities. And in fact the**
 17 **Memorandum of Understanding with the Groundwater**
 18 **Management District provides that the city will not**
 19 **use more than 40 million gallons a day of bank**
 20 **storage water as part of this total 100 million**
 21 **gallon a day project that we're proposing in toto.**
 22 **And I think technology may take those significantly**
 23 **below those levels.**

24 **Q Was the city required to do an environmental impact**
 25 **statement?**

1 **A No, the city was not required to do an environmental**
 2 **impact statement.**

3 **Q Did it nevertheless do so?**

4 **A Yes, we did.**

5 **Q When did that take place and what were the results?**

6 **A The environmental impact statement was completed in**
 7 **2003 and it was a comprehensive environmental impact**
 8 **statement, the same as would be done in any kind of**
 9 **federal project that requires a environmental**
 10 **impairment statement. Again, the city felt, given**
 11 **the public interest and concerns about this project,**
 12 **that we essentially leave no stone unturned and that**
 13 **an environmental impact statement was an important**
 14 **part of presenting an honest, open review of all**
 15 **aspects of this project.**

16 **Q Would it be accurate to say that that type of**
 17 **disclosure and request for review is designed to**
 18 **make sure that there's no unreasonable prejudice to**
 19 **public interest?**

20 **A That would be absolutely correct.**

21 **Q You mentioned briefly the permitting -- the permit**
 22 **applications that were prepared and also the MOU**
 23 **with the Groundwater Management District Number 2.**
 24 **Is there anything additional you want to add at this**
 25 **point?**

1 A Other than to say that I believe the city has,
2 again, acted in good faith both with regard to its
3 involvement of the public, with regard to its
4 interactions with regulatory agencies, with regard
5 to the submission of the applications and with
6 regard to the negotiation and agreement upon the
7 Memorandum of Understanding with the Groundwater
8 Management District.

9 Q Mr. Warren, I'd like to ask you to look in detail
10 now at the public interests or needs that are
11 driving this particular project. Can you -- can you
12 tell me the size in the number of people that would
13 benefit that would be using the water that would be
14 available to this project?

15 A The city of Wichita MSA, which is metropolitan
16 statistical area, has a population of over a half
17 million people. Wichita, as a retail and wholesale
18 water supplier, supplies 75 percent of the water in
19 this MSA. Included in those cities that are either
20 wholly or partially dependent upon Wichita for water
21 supplies are Derby, Andover, Eastborough, Rose Hill,
22 Kechi, Bel Aire, Park City, Benton, Bentley, Valley
23 Center, Rural Water District Number 8 of Butler
24 County, Rural Water District Number 1 and 3 of
25 Sedgwick County. According to the Kansas Department

1 of Human Resources statistics, Wichita has
2 19 percent of the state's total jobs and 31 percent
3 of the manufacturing jobs in the state of Kansas.
4 18 percent of the state's personal income comes out
5 of the Wichita MSA and 20 percent of the state's
6 taxable retail sales come out of this area. Wichita
7 to be sure is a vitally important part of the Kansas
8 economy and the economy of that region.

9 Q Mr. Warren, how does the city of Wichita water
10 utility rank in terms of size with other utilities
11 in the state of Kansas?

12 A Wichita is the largest water utility in the state of
13 Kansas.

14 Q Can you put some specific demand figures or water
15 supply figures on the needs that are generated by
16 that type of economic activity and personal use?

17 A As part of our study of water supply, of course
18 you've got to look at demand projections. In the
19 water supply plan there was a water demand
20 projection made in 1993 as a part of that report,
21 and it projected that by 2050 the city's average day
22 demand would be about 125 million gallons a day, and
23 the maximum day demand would be about 250 million
24 gallons a day. The city updated those demand
25 projections in 1997 as a result of the

1 implementation of the water rate structure that I
2 mentioned previously in this testimony. At that
3 time, we adjusted those demands, and the average a
4 day 2050 demand was down to about 112 million
5 gallons a day, and the maximum day demand was down
6 to about 225 million gallons a day. 2003, which is
7 the most recently complete year that we have records
8 for, the average day demand for Wichita was
9 55 million gallons a day, and the maximum day demand
10 was 107 million gallons per day.

11 I will mention that subsequent to that year
12 the city has added Derby which is a significant
13 retail customer, now wholesale customer, to its
14 customer base and that those demands from 2003 do
15 not include Derby which is projected this year to
16 have a -- and this will only be a partial year --
17 about 2.4 million gallons per day on average and
18 about 5 million gallons per day maximum impact on
19 those figures.

20 Q Mr. Warren, how does the city's water supply stack
21 up to this kind of demand?

22 A The city's water supplies which include Cheney
23 Reservoir, the equus beds, 55 local wells in the
24 equus beds and local wells that are located
25 immediately in the vicinity of the city's water

1 plant in downtown Wichita, have a combined total
2 average day capacity of about 78 million gallons per
3 day and a maximum day of 130 million gallons a day.

4 Q What's the relationship between the supply available
5 and the projected demand?

6 A Briefly, based on these demand curves and the
7 supplies that the city currently has available, it's
8 projected that the demand curve will intersect our
9 average day water supply capacity somewhere in the
10 time frame of 2010 to 2015.

11 Q And how does the development of the aquifer storage
12 recovery project play into that expectation?

13 A Well, it's the city's belief that in order to have
14 sufficient recharge credits to meet the demands
15 after that period, the city's going to have to
16 recharge the aquifer over about a 10-year period,
17 and that's being very aggressive, I think. So we're
18 on the cusp, if you will.

19 Q I'd like to ask you now a few questions relating
20 to -- specifically to the project implementation.
21 You've earlier mentioned that you sought a process
22 that was -- I guess we could term -- I guess the
23 intent is full disclosure here, is that correct?

24 A That's correct.

25 Q What type of public meetings and agency meetings

1 were involved that you can recall?
 2 **A I would make reference to the DWR Exhibits A and B**
 3 **which are the list of both public and agency**
 4 **meetings that the city has conducted, and I think in**
 5 **both cases the number of public meetings that have**
 6 **been held are in excess of 20. Now, the number of**
 7 **agency meetings are in excess of that. Now, the**
 8 **city has I think gone beyond what is reasonable with**
 9 **regard to trying to provide information to the**
 10 **public, to the regulatory agencies and fully**
 11 **disclosing all aspects of the project.**

12 **Q Mr. Warren, you're referring to city of Wichita**
 13 **Exhibits A and B in the DWR record, is that correct?**

14 **A That's correct.**

15 **Q Ultimately, what's the philosophy that the city has**
 16 **used in pursuing this particular project?**

17 **A Our philosophy has been, as you mentioned, one that**
 18 **is open, full disclosure, but I think more**
 19 **importantly a win-win philosophy. It's no secret**
 20 **that there has been animosity between the landowners**
 21 **in the equus beds and the city regarding the city's**
 22 **waters rights that have existed out there since the**
 23 **late 1940s and early 1950s, and I believe it was**
 24 **important from the very beginning to have a win-win**
 25 **type of approach to development of this project, and**

1 **I believe that was one of the things that drew me**
 2 **personally and professionally to this recommendation**
 3 **of the integrated local water supply plan to our**
 4 **governing body for implementation was that I believe**
 5 **it had elements that addressed not only the city's**
 6 **need but a larger need for that very valuable water**
 7 **resource, and among those mutual benefits that we**
 8 **seek from this project, one is protection of the**
 9 **aquifer from salt water contamination. Salt water**
 10 **from the Burrton oil fields, salt water from the Big**
 11 **Arkansas River are migrating into this area, and**
 12 **without the recharge of this project, that migration**
 13 **will continue to the point where, for many of the**
 14 **people who use the water for irrigation purposes or**
 15 **for drinking water purposes, without the benefit of**
 16 **water treatment plants like the city has, the water**
 17 **would be useless. We also believe that there is a**
 18 **benefit that comes out of this from stream flow**
 19 **enhancement. Because the Little Ark River is a**
 20 **gaining stream, which means that the outflow from**
 21 **the aquifer, when the aquifer is full, helps to**
 22 **provide base flow in the stream. As we recharge**
 23 **this aquifer, we believe that there will be an**
 24 **increase in base flow in the river that will be**
 25 **beneficial to downstream water right users, if you**

1 **will, but also wildlife and fish in the area.**
 2 **Improved pumping efficiency is something that all of**
 3 **us will benefit from, the city and the farmers and**
 4 **the residents who all have wells out there will**
 5 **benefit from the fact that groundwater levels will**
 6 **be higher and as a result suction lift to get the**
 7 **water out of the ground will require less energy and**
 8 **be more efficient. And, finally, because the city's**
 9 **water rights in many cases are senior to many of the**
 10 **water rights that are in that area, and because the**
 11 **aquifer has been in a state of decline for some**
 12 **period of time prior to the city undertaking its**
 13 **change in water use philosophy and consideration of**
 14 **this project, we believe that the possibility**
 15 **existed, or maybe even the probability existed that**
 16 **ultimately there would be a confrontation between**
 17 **the city and other water right holders in the area**
 18 **regarding impairment of the city's water rights from**
 19 **the continued decline in the equus beds, and we**
 20 **believe that this project will avoid that and keep**
 21 **the water in the equus beds as a beneficial resource**
 22 **not just for the city but for all of us. And our**
 23 **fates are intertwined. The community is more than**
 24 **just Wichita; the community is South Central Kansas.**

25 **Q Of course one of the issues that the chief engineer**

1 **has to look at is whether or not the appropriations**
 2 **requested would impair existing water right holders,**
 3 **and if I understand you correctly, the project is**
 4 **intended to actually benefit them and protect them**
 5 **from any contest of -- that might exist and**
 6 **diminishing the situation.**

7 **A In my mind, Mr. Hinkle, there's no question that**
 8 **this project enhances water rights of all users in**
 9 **the equus beds, that it does not impair any water**
 10 **right holder and that it is in the best interest of**
 11 **the public.**

12 **Q You've already described the number of agencies that**
 13 **have participated in the demonstration project that**
 14 **you've been conducting. What -- is there -- what**
 15 **type of input did you receive from them that was**
 16 **significant?**

17 **A For the most part it was with regard to the design**
 18 **of the project, how to set up monitoring for the**
 19 **project, both for water quantity and for water**
 20 **quality, and the types of data that would be needed**
 21 **in order to demonstrate that this was both feasible**
 22 **and a good thing to do, if you will. I don't**
 23 **believe that there's, again, any project in the**
 24 **United States that has been more monitored or tested**
 25 **than this demonstration project with the -- which**

1 the city's had going since 1995. There have been
2 more than 4,000 samples taken and tested for more
3 than 400 chemical constituents.

4 Q And what's been the result from the recharge in this
5 process of the demonstration?

6 A As of today, the city has successfully recharged
7 through three different methodologies over a billion
8 gallons of water.

9 Q Ultimately what have you learned out of this
10 demonstration project?

11 A Well, for one thing, and I mentioned this earlier,
12 we learned that we didn't need a 150 million gallon
13 a day project. A small project would accomplish
14 what we needed to accomplish, that being 100 million
15 gallon project. Now we've learned that we can put
16 more emphasis again on surface water versus bank
17 storage diversion. And as I mentioned, I think that
18 evolution continues. There are other things down
19 the road, technology continues to improve with
20 membranes in particular which may give rise to even
21 greater opportunities with regard to surface water.

22 Q One of the items that have already been admitted as
23 an exhibit is DWR Exhibit V, as in Victor, that's
24 the MOU. Does that contain some of the things that
25 you've learned in this demonstration project?

1 A It does. It -- as I mentioned, one of the things it
2 contains is the city's commitment to the amount of
3 bank storage diversion that it would do, that we
4 would not exceed 40 million gallons a day bank
5 storage. It contains other things. And the city
6 understands, and I believe that the concerns that
7 have been addressed by the public and by the GMD
8 represent legitimate business and personal interest
9 of the people that live and work in the equus beds,
10 and the city is listening to those concerns and I
11 believe has responded appropriately to those
12 concerns and will continue to respond appropriately
13 to those concerns. We've worked with the GMD staff
14 and with the GMD board to come up with the
15 Memorandum of Understanding, again placing greater
16 emphasis on surface water diversion, testing upper
17 and lower aquifer zone well screening to address
18 concerns they had about that, committing to a
19 four-year review to determine aquifer river
20 connectivity as part of this project, providing
21 supplemental monetary support to the GMD,
22 recognizing the limited resources that they had for
23 doing the monitoring so that they could avail
24 themselves of additional resources to provide the
25 independent oversight and review of the project as

1 it progressed. Again, in four years, looking at how
2 effective the initial phase of this project has been
3 with regard to salt plume control. Committing that
4 all water recharged is going to meet minimum
5 drinking water quality standards, and protection of
6 domestic water supplies from any project-related
7 future water quality excursions. All of these are
8 things that the Groundwater Management District
9 board and citizens have told us are important to
10 them, and again the city is trying to address those
11 needs to make sure that in no way is the public
12 interest not considered and protected.

13 Q All these factors that you've just now described,
14 could this properly be called a framework for your
15 project implementation that you're proposing?

16 A Yes, it would.

17 Q Mr. Warren, could you provide a summary evaluation
18 of the project as you see it going forward and its
19 importance?

20 A In summary, Mr. Hinkle, I would say that Wichita is
21 a major economic factor in the future of Kansas.
22 Wichita has a demonstrated need for additional water
23 supplies to meet the needs of residents, businesses
24 and industries. Wichita has made an extraordinary
25 effort to test feasibility of its proposed water

1 supply plan. The proposed plan makes the most of
2 existing local water supply alternatives. The
3 proposed plan provides benefits to all users of the
4 equus beds aquifer in the vicinity of Wichita's
5 proposed project. The project has been subjected to
6 review by local and national experts who have all
7 concluded that the project is a good one. Wichita
8 has provided opportunities for the public to learn
9 about and comment on the project. Wichita has
10 incorporated public concern into its implementation
11 and design of the project. Wichita has worked
12 cooperatively with the Groundwater Management
13 District to present a sensible, feasible and
14 mutually beneficial project to the Division of Water
15 Resources for permitting.

16 MR. HINKLE: Thank you, Mr. Warren.
17 Mr. Pope, this concludes my questions of Mr. Warren,
18 and I offer him for your examination or for that of
19 the district.

20 HEARING OFFICER POPE: You want to pass
21 that back. Thank you, Mr. Hinkle.

22 Let me turn to Mr. Adrian and see if he has
23 questions for the witness.

24 MR. ADRIAN: I do, yes.

25 CROSS-EXAMINATION

1 BY MR. ADRIAN:
 2 Q Mr. Warren, I realize that it's become politically
 3 correct to deny ever making any mistakes, but along
 4 this process that you've described, would you tell
 5 us of the mistakes you think may have been made and
 6 rectified.
 7 A Hummh. I'm not sure, Mr. Adrian, that I would
 8 characterize things as mistakes so much as learning
 9 along the way. I believe that, again, we're
 10 embarking on a new territory with regard to water
 11 supplies in the state of Kansas, and there are
 12 things that we have learned along the way about the
 13 way that the various types of recharge methodologies
 14 have worked. We've learned things about the geology
 15 and geography in the area that have helped us to
 16 better design the project. We've learned things
 17 about well design that have helped us to better
 18 design those wells. I cannot stand here and tell
 19 you honestly that I can point out a mistake. If
 20 you've got one that you think is a mistake, I'd be
 21 glad to comment on it.
 22 Q Well, I heard you describe it as an evolving
 23 process, and I think that's what it appears to be in
 24 your description is an evolving process which means
 25 a learning process to me. Would that be a correct

1 description?
 2 A That's correct.
 3 Q And so along the way, I think -- I've heard you
 4 personally acknowledge in prior meetings the
 5 sensitivity, and as you have now, to landowners,
 6 well owners within the district, sensitivity to
 7 their concerns the fact that that is their only
 8 supply of water, whereas you have presumably 27
 9 alternatives, and maybe others. So do you feel like
 10 the project has adequate built-in protections for --
 11 specifically concerning landowners and water users
 12 within the district?
 13 A Yes, I do, to the extent that we are aware of those
 14 and able to address them, yes, I do believe they are
 15 there.
 16 Q You also mentioned that you engaged the firm of
 17 Burns & McDonald as consultants and presumably
 18 designers in this area -- or in this project. Would
 19 you describe their qualifications to do that?
 20 A Burns & McDonald is one of the largest civil
 21 engineering firms in the United States. They have a
 22 long history of providing consulting services for
 23 major cities across the United States with regard to
 24 development of water supplies. We have, again, from
 25 my perspective, been very pleased with the work that

1 Burns & McDonald has done for the city. The
 2 selection of Burns & McDonald was a competitive
 3 process. We invited firms from throughout the
 4 United States to submit letters of interest and then
 5 proposals for consideration by the city before
 6 selecting Burns & McDonald to undertake this work
 7 for the city, and we believe that we selected the
 8 best firm for doing this work for the city.
 9 Q Are there projects in other locations in the United
 10 States that are similar to this from which you can
 11 gather information and experience?
 12 A I have read some literature, and without, again,
 13 giving you the specifics, I'm going from memory
 14 here, I know that there have been some aquifer
 15 storage and recovery projects that have been done in
 16 Florida, there have been some in California, I
 17 believe there was one in Ohio and Iowa. Most of the
 18 projects have been projects that have been related
 19 to retarding sea water intrusion, particularly those
 20 in the coastal states.
 21 Q You also mentioned in your testimony that the MSA,
 22 or -- or I think it's metropolitan service area, is
 23 it not?
 24 A Metropolitan statistical area.
 25 Q Statistical area, has approximately 500,000

1 residents within it, and you mentioned quite a
 2 number of adjoining cities or communities for which
 3 Wichita supplies water. I noted from memory that if
 4 the Wichita Eagle is to be believed that marriage
 5 between Wichita and some of those cities is not
 6 always smooth, is it?
 7 A I think it is safe to say that there have been
 8 disagreements between the city of Wichita and its
 9 neighbors, particularly with regard to growth.
 10 Q And I guess I was thinking more specifically rates
 11 of charge for the water.
 12 A I don't believe that there have been substantial
 13 disagreements with regards to rates charged for
 14 water because all of those cities signed contracts
 15 with the city and all of those contracts were
 16 approved by governing bodies, and --
 17 Q Ultimately my question is, if they were not to get
 18 water from the city of Wichita, where would they get
 19 it?
 20 A In some cases, I think the opportunities for those
 21 cities to obtain usable water supplies are very,
 22 very limited and very, very expensive as to compare
 23 to water supplies that they can get through the
 24 city, which by nature of its size has an economy of
 25 scale. It would be difficult for some of those

1 cities to get adequate water supplies.

2 Q Mr. Warren, in issue number five as defined by the
3 chief engineer, there was concern expressed, and it
4 eventually came into the form of an issue about the
5 effects of the raising of the water table within the
6 district, and I know there was the concern about
7 what it might -- the effect it might on basements on
8 areas where the water table is unusually high or
9 high. What consideration has the city given to that
10 issue and how does the city see its way to address
11 that issue?

12 A Well, Mr. Adrian, I would point out first, that the
13 city undertook, beginning in 1993 or four a change
14 in its water use which, again, placed greater
15 emphasis on Cheney Reservoir. As a result of that
16 change in, if you will, priority of water uses, the
17 city has used very little out of the equus beds
18 other than what was required to maintain wells
19 during that period of time. There's been a natural
20 increase in water levels throughout the equus beds
21 as a result of that change. I would also point out
22 that I don't believe that it's in the district's
23 best interests or anyone's best interests to
24 continue to de-water the aquifer. And I think
25 that's the trade-off that we all have to look at

1 answered that, but are those inconsistent or is that
2 a balance?

3 A I don't believe they're inconsistent, and, yes,
4 there's a balance to be drawn there with regard
5 to -- and, again, these are addressed in the
6 recommendations that your staff has made to the
7 Division of Water Resources with regard to priority
8 of use. One of the recommendations is that the city
9 and the Groundwater Management District will jointly
10 agree on an operations plan for the project. Part
11 of the city's philosophy with regard to that project
12 is the protection of water quality for the benefit
13 of the city and for the benefit of all users out
14 there. In doing so, our first phase of this project
15 is the beginning of the building of the hydraulic
16 barrier. That is also, in our philosophy, the last
17 water that we would consider using in the event that
18 the city needs to draw on its water credits. That
19 is an important part of the philosophy of protecting
20 the equus beds, and again I believe that's addressed
21 in operational matters that we've agreed upon with
22 the district.

23 Q And additionally the Memorandum of Understanding and
24 discussions with the district have focused on the
25 water that you -- the bank storage water, and

1 here. As a result of the rise in the water levels
2 resulting, again, from the city's change in
3 philosophical use of water supplies, I'm not aware
4 of anyone who has been adversely impacted by those
5 changes. Additionally, I believe that the city, if
6 it is ultimately shown that recharging the equus
7 beds back to what were a more natural level,
8 predevelopment level, of the equus beds for water
9 use, has an adverse impact on an individual or
10 individuals, the city will certainly look at those
11 with regard to keeping those individuals whole.

12 Q I presume by that statement or implicit in that
13 statement, Mr. Warren, would be, to me, that you
14 don't think it will be a problem.

15 A No, sir, I don't.

16 Q Would you reconcile for me what I consider to be
17 somewhat of a dichotomy in that if part of the
18 purpose of this project is to build a hydraulic
19 barrier to prevent or eliminate the movement of the
20 salt plume in an easterly or southeasterly
21 direction, and also to supply use, quantity, to the
22 city of Wichita, it seems like those two things are
23 inconsistent; in other words, if you're pulling
24 water out -- putting water in and pulling water out,
25 and I presume your technical studies would have

1 whether it was truly bank storage water or whether
2 it is groundwater that you will be withdrawing, and,
3 again, your technicians may need to answer this more
4 than you, but if you can, can you describe how that
5 assurance is given to the district and the public in
6 general that you will only be taking bank storage
7 water as opposed to groundwater?

8 A Now, again, I believe that the people that will
9 follow me and that will give the technical
10 explanations of those types of operations are better
11 suited to give that response. And, in fact, that's
12 one of the issues that Mr. Pope will decide upon in
13 allowing these permits.

14 Q But, in fact, from your knowledge -- overall
15 knowledge and general knowledge, that factor has
16 been considered and dealt with from the city's
17 standpoint.

18 A Yes, it has.

19 Q You stated just a few moments ago that the recharged
20 water will be some of the last water that you choose
21 to withdraw, and one of the dates you gave in your
22 direct testimony was that you see the need for
23 additional water by the city and those that it
24 supplies as coming somewhere around the year 2010 to
25 2015. Now, is that when you anticipate withdrawing

1 water?
2 **A That is a point in time at which the projected**
3 **demand curves and the water supply curves intersect**
4 **one another. Beyond that point in time to meet**
5 **those demands above and beyond that would require**
6 **withdrawal of recharge credits, that's correct.**

7 MR. ADRIAN: Just a moment. I have no
8 other questions at this time.

9 HEARING OFFICER POPE: Okay. Thank you,
10 Mr. Adrian. Let me turn to Mr. Rolfs and see if he
11 has questions.

12 MR. ROLFS: I have no questions. Maybe
13 there is redirect.

14 HEARING OFFICER POPE: Any redirect?

15 MR. HINKLE: No, Mr. Pope, I have no
16 redirect.

17 EXAMINATION

18 BY HEARING OFFICER POPE:

19 Q I only have one or two questions, Mr. Warren,
20 myself, and I suspect that in the applications
21 themselves the detail could be found, in the
22 supporting information, but can you summarize for me
23 the amounts of water for this particular group of
24 applications. I'm particularly just wanting to
25 reconcile what I heard you testify to earlier in my

1 **in total, Mr. Pope, that's about a 10 million gallon**
2 **per day recharge capability, when water is available**
3 **for recharge. So to say how much additional**
4 **capacity we're adding, the city, at this point, is**
5 **really not looking at adding so much additional**
6 **water rights capacity, although there have to be**
7 **some assigned in order to go through this process,**
8 **as we are in looking at establishing this hydraulic**
9 **barrier against the salt water plume movement. That**
10 **is more the goal of this part of the project.**
11 **Subsequent phases of this project will then add to**
12 **the recharge credits that the city is wishing to**
13 **create and apply for beneficial use of, but this**
14 **part of the project is focused more on the building**
15 **of the hydraulic barrier than it is on, if you will,**
16 **building water right credits. The next phase of the**
17 **project we anticipate will follow closely on this**
18 **and will be a surface water intake type of project.**

19 Q Okay. So I appreciate that. I think I understand.
20 So the 7,000 gallon a minute bank storage wells
21 roughly is equivalent to about 10 MGD, and then --
22 but of course that's really recharge capacity rather
23 than --

24 **A Right.**

25 Q -- supplying demand out the other way, which we'll

1 overall mind here, and that's I think you said the
2 1997 update of your average and maximum demands, I
3 believe you said about 112 MGD average, about 225
4 MGD maximum.

5 **A That's correct.**

6 Q And I believe I heard you say that you currently
7 have a capacity of about 78 average and about 130 --

8 **A 107, I believe it was.**

9 Q 107, was it?

10 **A Let me look back.**

11 Q That may have been what you did in 2003.

12 **A Yeah. 2003 max day was 107 -- or max day current**
13 **capacity we estimated 130.**

14 Q Yeah. Okay. Now, how much are you proposing to add
15 with this project, then, to your current capacity?

16 Is there a way to characterize that? I mean, I know
17 this is complex in terms of --

18 **A Yeah.**

19 Q -- withdrawal and storage and recovery, but I'm just
20 trying to get a sense of where this will take you
21 beyond your current capacities towards the goal that
22 you indicate was the 2050?

23 **A Each of the bank storage wells in the well strain,**
24 **there's seven of them, I believe, will have a**
25 **capacity of not more than 1,000 gallons per day, so**

1 be really focusing on later.

2 **A I don't see that the city would call upon any**
3 **recharge credits from this project other than in a**
4 **dire emergency.**

5 Q And in terms of the peer review, or whatever
6 terminology you used for the individuals that you
7 noted -- I know we'll be hearing from Mr. Nuzman, at
8 least he's listed as a witness later, but in regard
9 to the other individual or individuals from the
10 review -- I believe you said it was organized by
11 AWWA and that the results of that as you've used are
12 in the proposed exhibits?

13 **A It is one of your exhibits that are -- that's in the**
14 **file.**

15 Q The city's exhibits.

16 **A Yes.**

17 Q Yes. Okay.

18 HEARING OFFICER POPE: I don't believe I
19 have any further questions, so you may stand down.
20 Thank you.

21 THE WITNESS: Thank you.

22 HEARING OFFICER POPE: Mr. Hinkle, we're
23 either ready for your next witness, or I don't know
24 how long it will be. This may be a convenient time
25 for a short break?

1 MR. HINKLE: Mr. Pope, possibly a good
2 time for a break, we have a number of drawings to
3 set up.

4 HEARING OFFICER POPE: Okay. Why don't
5 we take about a 10-minute break here and we'll
6 reconvene at that time. Thank you.

7 (There was a recess from 9:37 a.m.
8 to 9:54 a.m.)

9 HEARING OFFICER POPE: Let me call the
10 hearing back to order. Mr. Hinkle, I'll turn it to
11 you.

12 MR. HINKLE: Thank you. Mr. Pope, the
13 city next calls Mr. Jeffrey Klein as a witness.

14 JEFF KLEIN,
15 called as a witness, having been first duly
16 sworn, testified as follows:

17 DIRECT EXAMINATION

18 BY MR. HINKLE:

19 Q Mr. Klein, will you please state your name and give
20 us a general statement of your background education.

21 A Sure. Jeff Klein. I'm a professional engineer.
22 I've been with Burns & McDonald Engineers for 18
23 years. I have a bachelor's in science from -- in
24 civil engineering from University of Cincinnati, and
25 a master's in civil engineering from the University

1 from 1995 through 2003 Wichita reduced pumpage from
2 the equus beds by 46 billion gallons. We
3 recommended the reuse of Gilbert Mosley water. That
4 was groundwater, remediation water, that was being
5 treated. We wanted that to go back to the water
6 treatment plant and be added to other -- other flows
7 and treated. Continue to enhance water conservation
8 measures. We had 160 MGD, million gallon per day
9 intake, in the Little Arkansas River at the water
10 treatment plant. Then redevelopment of Bentley
11 reserve well field. That would be high chloride
12 water that will be blended with water from the equus
13 beds. We had 100/50 MGD ASR project. That's 100
14 million gallons per day of diversion through wells,
15 and 50 million gallons per day diversion through
16 surface water. And that -- the ASR project is the
17 key element of the integrated local water supply
18 plan. Various pipeline and recovery wells in the
19 equus beds to provide -- help provide maximum day
20 demands, and a 90 million gallon per day water
21 treatment plant expansion in the city. We also
22 recommended the investigation and demonstration of
23 aquifer storage and recovery feasibility in the
24 equus beds well field and future re-evaluation of
25 reverse osmosis treatment.

1 of Cincinnati in 1986. I've been working on, as
2 project manager or project engineer, on Wichita's
3 water supply system since 1992. In addition to
4 working on Wichita's water supply system, I've also
5 worked on over a dozen water resource development
6 projects across the country for other clients.

7 Q Mr. Klein, as manager of the projects here in the
8 city, what projects have you completed that are
9 associated with this application before Mr. Pope?

10 A Let me take a little time to highlight the major
11 studies, reports and installation of facilities that
12 are associated with these applications. As David
13 talked about, in 1999 -- or 1993, excuse me, there
14 was a water supply study. This was the initial
15 project as far as Burns & McDonald was concerned.
16 Wichita wanted to determine if Milford Reservoir was
17 the best source for the city and their regional
18 customers. We evaluated 27 conventional and
19 nonconventional alternatives, including the no
20 action alternative. The integrated local water
21 supply plan was recommended. It included the
22 following components: First was to change the
23 priority of use of the equus beds well field. Equus
24 beds water was the first call. It became second
25 call to Cheney. This was implemented in 1994, and

1 Q What was the second project which you were involved?

2 A The second project was essentially a demonstration
3 project. It started in 1994 and ran through 2000.
4 The demo project was implemented to determine if
5 water could be captured, treated and recharged; what
6 the potential impacts were, both positive and
7 negative, and develop design and operational
8 criteria. We developed two 1,000 gallon per minute
9 aquifer storage and recovery systems, one for
10 surface water and one with a diversion well and a
11 storage well. Wichita's demo projects are actually
12 larger than most city's full scale projects.
13 Additional studies, reports and design projects
14 associated with the development and implementation
15 of the demo project included an environmental
16 assessment in 1994, feasibility study in 1994. The
17 demo project was designed and construction
18 observation was provided during the installation in
19 1996 and 1997. The quality assurance plan for water
20 quality sampling analysis was completed in 1997 and
21 approved by EPA and KDHE. An operations and testing
22 manual for the demo project was completed in 1997.
23 Operations assistance was provided from 1996 through
24 2000. Annual reports were generated during that
25 time period, and those were all issued to

1 cooperating agencies. The city has completed
2 several pilot studies relating to the treatment of
3 surface water, two with ballasted flocculation and
4 two with filtration systems, and the city is looking
5 at another filtration project in 2005.

6 A final report on the demo project was
7 submitted to the Bureau of Reclamation as part of
8 the High Plains Aquifer Recharge project in 2000.
9 That's DWR Exhibit Q. The demo project worked well.
10 There were no negative impacts on water quality.
11 The diversion well, intake, recharge wells and the
12 recharge basins had no negative impacts on the
13 environment. We recharged, as David said, over a
14 billion gallons of water. We recommended recharge
15 techniques based on cost and performance for
16 different hydrogeologic conditions. For instance,
17 recharge wells or basins with passive wells work
18 better when you have deeper clays. We also
19 recommended additional pilot testing on the surface
20 water treatment, handling of surface water
21 residuals, concrete sides on the basins, and some
22 other operational issues.

23 Q What was the third project under your management?

24 A The city completed over 50 test holes from 1994 to
25 2000 to help characterize different portions of the

1 study area. And test holes were drilled and logged
2 and that data used to evaluate and upgrade the
3 model.

4 Q The fourth project that you managed, what was that?

5 A The local well field is another component of the
6 integrated local water supply plan. We looked at
7 increasing the capacity of the city's emergence in
8 the Sim well fields through expansion from about
9 45 million gallons per day of pumping capacity to
10 75. So that included several projects. We did a
11 feasibility study. We did a test well project and a
12 final environmental assessment in 1999. With all
13 these projects we did some sort of environmental
14 documentation to make sure everything was clear and
15 everyone was notified what was going on, including
16 the public and the agencies.

17 We're currently evaluating improvements for
18 the Sims well field, and we are also in phase one of
19 a horizontal collector well investigation.

20 Q Did you have a project relating to the yield
21 analysis of Lake Cheney?

22 A Yes, sir, we did. In 1998 we evaluated the firm
23 yield for Cheney Reservoir to determine what the
24 actual yield was and what the potential was for
25 shortfall risks. We completed the analysis in

1 conjunction with the Bureau of Reclamation and the
2 state and used state methods which are basically
3 running the 1950s drought scenario through the lake,
4 and that resulted in a firm yield of 47 -- or excuse
5 me -- 43.7 millions gallons per day, or 49,000 acre
6 feet per year.

7 Q Mr. Warren talked about a reevaluation of demand.
8 Did you participate in that type of endeavor?

9 A Yes, we did, and that's DWR Exhibit U, customer and
10 demand reevaluation in 1997, from the 1993 master
11 plan. We utilized three years of water use data
12 that had the impact of the water conservation
13 measures, the rate, the additional public education
14 and other items that David talked about. And based
15 on -- based on that evaluation, the demand for
16 average day decreased from 125 down to 112 million
17 gallons per day. And maximum day decreased from 249
18 to 223 million gallons per day.

19 Q Did you manage a project relating to the drilling of
20 index wells?

21 A We completed the installation of 76 monitoring wells
22 in the equus beds well field. That's two wells, one
23 shallow and one deep, for each index cell. And
24 there are 38 index cells, and those were selected in
25 cooperation GMD2, and I believe KGS had some input.

1 USGS took initial water level measurements and
2 continues to collect based on water quality samples.
3 And the GMD is currently monitoring water levels in
4 the index cells. That data is available in the KGS
5 Wizard database and available to the public.

6 Q You earlier mentioned reverse osmosis technology?

7 A Yes. The technology has improved substantially
8 since the early '90s, cost has come down, energy
9 use, and the potential of using RO in the integrated
10 local water supply plan was reevaluated. We did a
11 paper study in 2001. The city hired another firm
12 and they did a study in 2003. We have submitted a
13 draft report for an RO water treatment evaluation
14 and operations modeling evaluation to look at the --
15 how the treatment of water from the Ark River might
16 impact the integrated local water supply plan.

17 Q Did the Burns & McDonald work also extend to a
18 design for the full scale ASR system?

19 A Yes, it did. That was completed -- that concept
20 design was completed in 2000. We refined the
21 integrated local water supply plan to include
22 continued water conservation measures. The city has
23 continued modification in the operation of Cheney
24 and -- Cheney Reservoir and the equus beds well
25 field. They are currently using about 30 percent of

1 the water from the equus beds where it used to be
2 60 percent. And this has had major impacts on water
3 levels in the equus beds well field area and has
4 helped to protect water quality already. This plan
5 change has caused the city to implement additional
6 projects at Cheney. Because they're using more
7 water, they're currently adding ozone to help
8 control taste and odor issues. The city reduced
9 their pre-1993 normal pumpage and has conserved or
10 restored or saved 46 billion gallons in the equus
11 beds. That's 142,000 acre feet.

12 Now, we lowered the ASR capacity to 100
13 million gallons per day. The plan still includes
14 redevelopment of Bentley Reserve well field and
15 expansion of the local well field to 75 million
16 gallons per day capacity.

17 When we did the design criteria, at that point
18 in time we were looking at 75 MGD of diversion well
19 and 25 MGD of surface water. We started to
20 incorporate some of the things we had learned in
21 pilot testing and also looked at what we call a
22 40/60, which is 40 million gallons per day of
23 diversion wells and 60 MGD of surface water, a 10/90
24 and a 0/100 plan. The 75/25 at that time was still
25 the best option.

1 completed a hydrobiological monitoring plan in 2004.
2 This plan will implement monitoring to ensure
3 environmental protection once the project is
4 permitted. Protection of the environment has always
5 been and will always be an important part of the
6 integrated local water supply project.

7 Q Mr. Klein, from the environmental studies and
8 evaluations that have been conducted up to this
9 point, do you have an opinion as to whether this
10 project would cause an unreasonable deterioration of
11 the water quality at any water user's point of
12 diversion beyond a reasonable economic limit?

13 A We don't -- we have found no reason, no evidence
14 that any negative impact is being incurred by
15 anyone; only positive benefits. And, for instance,
16 raising the water level, helping to protect and
17 preserve the water quality, restoring the aquifer.
18 We've done -- we're currently in the ASR phase one
19 design phase, before we start to build the hydraulic
20 barrier to slow the migration of chloride
21 contamination from the Burrton area to the west.
22 The recharge area for the phase one project,
23 that area is --

24 Q Is this a DWR exhibit?

25 A That is City Exhibit L.

1 Q Did your work include more generalized environmental
2 evaluations?

3 A The city has completed extensive environmental work
4 as part of this project. They've done aquatic
5 monitoring and reports on the Little Ark River, the
6 north fork of the Ninescah and the Ninescah Rivers
7 from 1995 through 1998. They've done in-stream flow
8 incremental modeling studies for those same rivers
9 in 2000 and 2001. They completed an EIS in 2004.
10 That's DWR Exhibit T. It wasn't required, but the
11 city thought this document was necessary to protect
12 the public interests, seek input, and inform the
13 public and the agencies. GMD2 was the sponsoring
14 agency. We have a schedule on the screen, as well
15 as here, which is from the EIS and shows the
16 completion schedule for the project. It shows phase
17 four of the ASR project being completed by 2012 --
18 or being operational by 2012. It also shows the ASR
19 phase one as being operational in 2005. So we're
20 behind schedule. The goal was to get the project
21 operational by -- starting in 2012 so we could
22 recharge water and have recharge credits available
23 in -- by 2015, 2016, because that's when we're
24 projected to exceed the current water rights.

25 In addition to the EIS, the city also

1 Q City Exhibit L.

2 A This portion of the well field, we were looking at
3 installing the recharge wells and basins is not a
4 major -- majorly dewatered portion in the aquifer
5 but is essential to help start to build that barrier
6 and slow the migration of the salt water
7 contamination, water contamination, from penetrating
8 into the well field. The city has always felt that
9 was a major distinguishing factor from the Milford
10 project because it did help to preserve and protect
11 the equus beds. Burns & McDonald is currently
12 developing site specific design criteria for the
13 diversion wells, recharge wells and basins.

14 Q Is Burns & McDonald involved in any specific agency
15 or public participation in this project?

16 A There has been extensive involvement and inclusion
17 in the state and federal agencies and the public
18 from the beginning of the project. We've had at
19 least annual meetings. USGS has a website that's
20 available to view the data. The Groundwater
21 Management District puts out a quarterly newsletter
22 with updates on the ASR project, and we send monthly
23 project reports out to the project team, which
24 includes all the cooperating agencies.

25 Q Could you please tell us what the full scale ASR

1 project includes.
 2 **A** The plan is broken up into four major phases. Phase
 3 one shown in red. See if I can do this without
 4 burning out Jay's eyes. Includes seven diversion
 5 wells, nine and a half miles of pipe, four
 6 recharge/recovery wells. Seven diversion wells,
 7 four recharge/recovery wells, and two recharge
 8 basins. And that has a capacity of 10 million
 9 gallons per day.

10 The next phase will be surface water. Which
 11 surface water phase is still up in the air, but it
 12 could be a surface water intake, ballasted
 13 flocculation and filtration for 30 million gallons a
 14 day, 21 and a half miles of pipe, 23
 15 recharge/recovery wells. That will be either phase
 16 two, three or four. Phase two could also be surface
 17 water intake, ballasted flocculation, 11 and a half
 18 miles of pipe and six recharge basins. And that
 19 also has a capacity of 30 million gallons per day.
 20 Phase three or four would be a 30 million gallon
 21 capacity of the -- including 21 bank storage wells,
 22 eight miles of pipe, 15 recharge/recovery wells and
 23 two basins. Phases two, three and four will be
 24 determined, but we do know that phase two will be --
 25 will rely on surface water diversion. How it's

1 recharged is yet to be determined.
 2 Based on the MOU the next phase of the ASR
 3 project will be surface water, no more than 40 MGD
 4 of diversion wells. The 100 MGD ASR system is
 5 adequate, based on the reduced city demands and the
 6 increased recharge capacity -- increased recharge
 7 capacity would fill the aquifer quicker after
 8 extended dry periods, but isn't required. And
 9 that's....
 10 **Q** And more detail on this subject can be found at City
 11 Exhibit L, is that correct?
 12 **A** Correct.
 13 **Q** Now, can you explain the components of the ASR
 14 project one in more detail.
 15 **A** As I've said, the ASR phase one project has a
 16 capacity of 10 million gallons per day of diversion
 17 and recharge. The plan was modified due to arsenic
 18 levels in diversion wells one and two and land
 19 access for what was recharge basin one is now
 20 recharge/recovery well four. Basically, the --
 21 we've moved -- switched to a -- from a basin to a
 22 well and moved it across the street. Groundwater
 23 Management District has approved the changes to the
 24 applications, and that was done in the last GMD
 25 meeting last week.

1 **Q** And the filing that was presented to Mr. Pope this
 2 morning reflects those changes, is that correct?
 3 **A** Correct. And that's -- this is exhibit -- City
 4 Exhibit Q.

5 So we have our diversion wells, we have the
 6 two southernmost wells, one and two, which were high
 7 in arsenic. Because of those high arsenic levels,
 8 we drilled two extra wells, eight and nine. And
 9 those have much, much lower arsenic levels. The
 10 first seven wells had an average of 1,000 gallons
 11 per minute per well, but the capacities actually
 12 ranged from 500 to 1,500 gallons per minute. The
 13 MOU dictates 1,000 gallons per minute per well.
 14 Then we have collection piping, 24-inch pipe that
 15 connects it down with the existing system that's
 16 about eight miles long. We have an arsenic
 17 treatment facility, recharge/recovery well one, two,
 18 three and four, and two recharge basins.

19 The exhibit on the screen is Exhibit R, City
 20 Exhibit R, and it shows the locations of the wells,
 21 the diversion wells, these are the circles one, two,
 22 three, four, five, six, seven, eight, nine, the
 23 connecting piping. And, again, one and two were
 24 high in arsenic, so we looked up here to the north,
 25 because arsenic concentrations decrease as you move

1 further north.
 2 **Q** You're looking for City Exhibit M?
 3 **A** Yes. This is City Exhibit M. This represents a
 4 typical schematic for a diversion well. You see we
 5 have a small site that we're taking up, about 50
 6 foot by 50 foot, approximately 50 foot off the
 7 river. We have a well, a meter bulb, piping that's
 8 connected, overhead power lines, some underground
 9 electric. We have a -- EP is a electrical platform
 10 that's used -- power comes in to the electrical
 11 platform and then splits two ways to serve two
 12 recharge/recovery -- or two diversion wells. Gravel
 13 road. Minimal impact. Minimal visibility. Those
 14 are submersible pumps used in the wells so very
 15 little sticks up above ground aside from the
 16 electrical platform and a vent line.
 17 **Q** You're moving to City Exhibit N?
 18 **A** Yes, sir. It might actually be City Exhibit O on
 19 the screen.
 20 **Q** All right. Thank you.
 21 **A** And that is a typical recharge basin. We're talking
 22 about a fairly large area, about eight acres total.
 23 Got sandy bottoms, concrete sides. The area would
 24 be fenced. We have a control room to -- when water
 25 comes in, water is metered, and then goes -- is

1 then -- follows the line where it's discharged into
 2 the basin.
 3 Q And what is involved in the monitoring well network
 4 at the diversion site?
 5 A At the -- can I just talk quickly about these?
 6 Q Oh, certainly, certainly. I didn't know you --
 7 A Yeah. The recharge well schematic, basically we
 8 take up an acre of land, basically a 200 foot
 9 square, to -- the well is approximately in the
 10 middle to maintain source water -- meet source water
 11 protection criteria. We have a separate control
 12 building and a well building -- or, yeah, the well
 13 is in the building. We have a power supply. Water
 14 comes into the control room, goes to the well. The
 15 well is also equipped with a pump so water can -- so
 16 the well can be redeveloped, and that water is
 17 pumped out and put into the system so it's used by
 18 the city. So it's recovered. And that's a City
 19 Exhibit N.
 20 For the monitoring well network we have a
 21 whole network at the diversion well site, in
 22 accordance with the MOU. We have six monitoring
 23 wells around recharge/recovery well three, in
 24 accordance with the MOU, four monitoring wells
 25 around recharge/recovery wells one, two and four in

1 accordance with the memorandum of understanding, and
 2 two monitoring wells around the recharge basins.
 3 The arsenic levels at the diversion sites had a
 4 concentration, when all the wells are on, of 12.1
 5 micrograms per liter, which is obviously greater
 6 than the standard -- drinking water standard of 10.
 7 Diversion wells one and two had respective levels of
 8 15 and 21 micrograms per liter, while well three is
 9 17, all the other wells ranged from five to 13.
 10 Well one also had a low yield, so because of
 11 diversion well one's low yield and high arsenic, and
 12 well number two's high arsenic levels of 21, we
 13 shifted and went with the other wells.
 14 Q How is the water treatment for arsenic accomplished?
 15 A Well, because of the excellent treatment provided by
 16 bank filtration, the only parameter that we have to
 17 treat is arsenic, with the bank storage wells. The
 18 drinking water limit is -- promulgated drinking
 19 water limit is 10 micrograms per liter, and the city
 20 will treat to meet that primary drinking water
 21 limit. Basically, we will take a portion of the
 22 flow and treat it through either an adsorption or a
 23 co-precipitation treatment process. We expect a
 24 pilot co-precipitation process in 2005 after the
 25 permit is issued. Both these processes are

1 accomplished in a pressurized vessel.
 2 Final design and the operations plan will
 3 depend on the actual well performance and quality
 4 and quantity of water available in each of the bank
 5 storage wells.
 6 Q Are there any other water quality issues?
 7 A There are two primary -- are two water quality
 8 issues that we dealt with on the project. One was
 9 chlorides. Ambient concentrations for the ASR phase
 10 one project have chlorides ranging in the 10 to
 11 30 microgram -- milligrams per liter range. The
 12 chloride plume that's approaching the area is in
 13 excess 300 milligrams per liter, and it's about a
 14 mile away. The secondary standard for chloride is
 15 250 milligrams per liter. Wichita city wells 41 and
 16 42 are currently running at about 100 milligrams per
 17 liter. Right at the -- well 41 is the southern
 18 extent of the ASR phase one project. One more.
 19 There's wells 41 and 42. So those city wells have
 20 been experiencing an increase in chlorides. In
 21 fact, it's about double what chlorides are in the
 22 rest of the system.
 23 Now, the Halstead diversion well, during the
 24 demonstration project, had chlorides ranging from 65
 25 to 70 milligrams per liter. We don't expect -- no

1 negative impact will occur from recharging water,
 2 but a positive one will. Water quality will not
 3 deteriorate above drinking water standard, and we
 4 won't have to restrict -- our future water use won't
 5 be restricted as shown in the no action alternative.
 6 Based on the no action alternative, chlorides will
 7 increase in excess of three or 400 milligrams per
 8 liter and restrict current uses of the water for
 9 many of the users.
 10 The other water quality issue is atrazine.
 11 Absorption of triazine herbicides or atrazine in the
 12 bank filtration process by the silts and clays
 13 successfully remove them as shown in the USGS water
 14 quality data for the recharge water. Now, the Safe
 15 Drinking Water Act limit is three micrograms per
 16 liter.
 17 Water quality analysis: Detection limit with
 18 GC/MS is .001 micrograms per liter, and with the
 19 Elisa kits is 0.1 micrograms per liter. The
 20 diversion well ranged from a nondetect to a 0.09
 21 micrograms per liter during the demonstration
 22 project, while atrazine in the river ranged from .3
 23 to 46 micrograms per liter in Halstead.
 24 During the demonstration project we started
 25 with no atrazine in the diversion wells -- the

1 diversion well at Halstead, and had occasional low
2 but measurable concentrations after common periodic
3 pumping. Atrazine is not expected to be an issue
4 in the lower screen -- lower zone screens of the
5 diversion wells, but could be in the shallow zone
6 screens. Under the MOU, the use of shallow --
7 screens in the shallow zone will be evaluated in
8 2005.

9 Q Mr. Klein, based on this kind of detailed data, do
10 you still hold to your conclusion that there would
11 not -- this project would not cause an unreasonable
12 deterioration of the water quality at any water
13 user's point of diversion?

14 A This project will not cause a reasonable
15 deterioration of water quality, and it in fact will
16 have a positive one of helping to protect by
17 restoring the levels and building the hydraulic
18 barrier.

19 MR. HINKLE: Thank you. I have no
20 further questions. Mr. Pope, shall I pass this to
21 Mr. Adrian?

22 HEARING OFFICER POPE: Yes.

23 MR. ADRIAN: Again, with your permission
24 I will remain here at my table and my notes.

25 HEARING OFFICER POPE: That's fine.

1 he's seen in other parts of the world and got -- and
2 incorporated his input into the design and the
3 operations. He assisted in peer reviewing in the
4 design process as well as the operations process.
5 He came and visited the facilities after they were
6 constructed.

7 Q So has he -- he's continued his involvement, then?

8 A Yes, he has.

9 Q Just -- although you may not be able to list a lot
10 of them, but can you give us and those present some
11 idea of his experience in recharge projects in the
12 United States that are -- that would possibly be
13 similar to this?

14 A I'll defer that to Dave Stous, but I will say that
15 this project is very unique for recharge. Most
16 the -- if you look at what recharge projects have
17 been accomplished across the country, a lot of them
18 involve injection of waste water for either water
19 reuse or chloride -- salt water control. In Florida
20 you get a lot of projects, and the same in Des
21 Moines, where they treat excess water at the water
22 treatment plant and inject it into the ground into
23 an aquifer that nobody uses, and then they pull that
24 water out during peak periods to meet needs.

25 Q And that is something that he was involved in

1 CROSS-EXAMINATION

2 BY MR. ADRIAN:

3 Q Mr. Klein, you indicated at the outset of your
4 testimony that I think you have worked on 12
5 projects throughout the United States which involved
6 recharge, is that correct?

7 A No. Oh, that have involved water supply
8 development.

9 Q Not necessarily recharge.

10 A Correct.

11 Q How many of those were recharge projects?

12 A None.

13 Q None of them were?

14 A Correct.

15 Q So this is a case of first impression for you?

16 A The studies, the design, the installation, the
17 operations work we've done with the city on their
18 two 1,000 gallon per minute ASR projects are some of
19 the medium-size projects that have been completed in
20 this country. And there are no other recharge
21 projects in Kansas, so to a certain extent I guess
22 that makes us the experts on recharge in Kansas.

23 Q What about --

24 A And we also brought in Herman Bauer, the grandfather
25 of recharge, during the design to talk about things

1 personally?

2 A I don't know.

3 Q I'm now referring to your -- I think it's Wichita
4 Exhibit L, which I believe is the card that you have
5 up there and the -- the exhibit on the screen, and
6 in that you have circled up toward the center part
7 of that exhibit the proposed bank storage wells, do
8 you not, in more bold red?

9 A Correct.

10 Q And then as you proceed southeasterly along the
11 little river, Little Arkansas River, there are what
12 I observe as three other oblong circles?

13 A Correct.

14 Q Are those the proposed withdrawal locations?

15 A Tentatively.

16 Q Well, that's what I was going to ask you. How
17 committed are you to those locations?

18 A There's no firm commitment to those locations, nor
19 is it known whether that would be phase three or
20 four or whether they would ever be installed.

21 Q The -- you also mentioned with some specificity the
22 monitoring wells that are to be installed pursuant
23 to the memorandum of understanding, and I was
24 wondering whether you could go into a greater
25 description of how those monitoring wells will work.

1 In other words, again, for the benefit of us and the
 2 public in general, how are they functioning to
 3 protect the public interest?
 4 **A Monitoring wells are placed, as I recall, at various**
 5 **north, south, east, west of the recharge site. And**
 6 **they will be used to monitor water level and water**
 7 **quality so the impacts of the ASR project can be**
 8 **monitored, as well as the impacts of other users in**
 9 **the area.**
 10 Q And what is it about those -- that monitoring that
 11 is going to trigger a change in what you may -- in
 12 what those wells may be doing? Not the monitoring
 13 wells, but the recharge wells or the bank storage
 14 wells.
 15 **A Now, can you repeat the question?**
 16 Q What -- what signals are you going to get from those
 17 monitoring wells that will cause some modification
 18 of what you may be doing at the moment? I mean, is
 19 it water quality? Will that be a continuous measure
 20 that you're taking?
 21 **A Water quality will be a continuous measure. Not out**
 22 **of the monitoring wells as much as through -- at the**
 23 **arsenic treatment plant we'll be continuing to**
 24 **monitor specific criteria of specific conductance of**
 25 **pH.**

1 Q And I gather and implicit in that answer is that
 2 there are some standards that you will set, beyond
 3 which, if those standards are exceeded, then you
 4 will modify apparently the withdrawal or the
 5 injection of water.
 6 **A An operations plan will be developed with the**
 7 **Groundwater Management District.**
 8 Q And that's not in existence at the moment, then.
 9 **A No. No, it is not.**
 10 Q Of the three quality issues that you mentioned,
 11 which were atrazine, arsenic and chloride, you
 12 indicated I think, first of all, that atrazine did
 13 not appear to be a problem if the water -- or it
 14 appeared to be less of a problem if the water was
 15 drawn from the lower screening?
 16 **A Correct. And that's based on three years of**
 17 **operating data from the Halstead demonstration well.**
 18 Q But again, is it not the understanding and
 19 commitment under the Memorandum of Understanding
 20 that you will, to the greatest extent possible, use
 21 the upper screening?
 22 **A It is written into the MOU that we will evaluate a**
 23 **shallow well and the impact of that well on the**
 24 **water quality. It's also written that if it's -- if**
 25 **the shallow well does deteriorate the water quality,**

1 **that it won't be -- the well -- the diversion**
 2 **well -- or bank storage well will not be screened in**
 3 **the shallow portion of the aquifer.**
 4 Q What will go into those -- to that evaluation? What
 5 consideration will you give to that evaluation?
 6 **A The capacity and the water quality, if it's**
 7 **available through the shallow portion, and how that**
 8 **compares to the lower portion. What the blend --**
 9 **blended water quality would be.**
 10 Q And that will be in -- I gather from your testimony
 11 and from the Memorandum of Understanding, that will
 12 be -- you'll be in constant contact with the
 13 district in regards to those decisions.
 14 **A Certainly. The details of that task have to be**
 15 **worked out with the district. Everything is pending**
 16 **issuance of a permit at this stage.**
 17 Q You also indicated that -- or the second quality
 18 issue was arsenic, and have you determined the
 19 source of that arsenic?
 20 **A It's naturally occurring.**
 21 Q Can you be a little more explicit about that?
 22 **A I'm not a geologist, so I can defer to Dave Stous or**
 23 **tell you that it's -- arsenic naturally occurs more**
 24 **at different concentrations just like iron does in**
 25 **different parts of the formations in the aquifers.**

1 **This is not a homogeneous aquifer.**
 2 Q So my impression is that as with atrazine or other
 3 quality issues are going to be monitored on a
 4 continuous basis. Is that what you're saying?
 5 **A Water quality will be monitored on a -- different**
 6 **parameters will be monitored on a continuous basis.**
 7 **Not in all parameters. You can't monitor arsenic on**
 8 **a continuous basis.**
 9 Q You cannot.
 10 **A No.**
 11 Q How will you monitor it then?
 12 **A You sample. You set the system up and you take your**
 13 **sample. There's hits as well as lab techniques.**
 14 **One thing we found in the Halstead test well,**
 15 **diversion well, was that the arsenic concentrations**
 16 **are very consistent. They pretty much ranged from**
 17 **20 to 22 from the time we drilled the test hole**
 18 **without pumping and after years of pumping, just**
 19 **vacillated within that range. So once you know what**
 20 **your concentrations are, it's very simple to get a**
 21 **proper blend of water.**
 22 Q When the water is withdrawn from bank storage wells,
 23 is treated or monitored -- and/or monitored and sent
 24 through this nine to -- eight, nine mile pipeline to
 25 the injection wells, recharge/recovery wells, what

1 is -- what quality standard do you follow with
 2 regard to the water actually going down into the
 3 ground? What -- what is the measure that you --
 4 you're placing on it at that point?
 5 **A It's going to meet drinking water -- primary**
 6 **drinking water standards.**
 7 Q And what is that?
 8 **A A very long list of standards. For instance,**
 9 **arsenic, its promulgated limit is 10, effective I**
 10 **think January 2006. There's limits on others.**
 11 Q So it's a composite, and not a one number standard.
 12 **A I'm not sure, and some of those details have yet to**
 13 **be worked out with KDHE.**
 14 Q Are you not the person I should be asking that?
 15 **A Whether it's a composite or whether it's a --**
 16 Q Yeah.
 17 **A The arsenic level will always be below 10.**
 18 Q As to the other quality issues, what standard do you
 19 apply, or do you know?
 20 **A The primary drinking water standards.**
 21 Q In all cases.
 22 **A (Nodded head up and down.) Yes.**
 23 Q So it is conceivable that the water in the aquifer
 24 into which this recharge water is being inserted
 25 could have a different chemistry than the recharge

1 water.
 2 **A It could be different. It could have higher arsenic**
 3 **or it could have lower arsenic. It could have**
 4 **higher chlorides or lower chlorides.**
 5 Q Have you worked out a system whereby you will test
 6 that water, in other words, the water in the aquifer
 7 which is receiving the recharge water?
 8 **A That's the water that comes out of the monitoring**
 9 **well that we're -- and the index wells.**
 10 Q One of the issues that has been raised frequently
 11 within the discussions of the district and by the
 12 manager and by the consultant is whether these bank
 13 storage wells will actually be withdrawing bank
 14 storage water or whether they will be withdrawing
 15 groundwater, and can you describe for us possibly
 16 in -- hopefully in laymen's terms of how you
 17 differentiate between those two and how the system
 18 is set up so -- to assure all of us present that you
 19 are withdrawing bank storage water as opposed to
 20 ground water?
 21 **A When we did the demonstration project -- use that as**
 22 **an example -- we went through an extensive test. I**
 23 **think we pumped the well for in excess of 90 days.**
 24 **We had an extensive monitoring system looking at**
 25 **changes in water surface level, both in shallow and**

1 **deep monitoring wells, to assess the path that the**
 2 **water took to get to the well, what sort of**
 3 **decreases or increases occurred, how things changed,**
 4 **what happens with -- compared to the river level.**
 5 **And Jerry Blain has some very interesting**
 6 **hydrographs to show how that works.**
 7 Q By that last statement, I'm taking that he's the one
 8 to ask that question of which -- of whom to ask that
 9 question.
 10 **A He has the hydrograph and he can -- exhibit, and he**
 11 **can give you a -- I believe it's part of his**
 12 **testimony to get to give you more -- all the**
 13 **details.**
 14 MR. ADRIAN: I have no other questions at
 15 this time.
 16 HEARING OFFICER POPE: Any redirect for
 17 Mr. Klein?
 18 MR. HINKLE: I do have one line of
 19 questioning.
 20 REDIRECT EXAMINATION
 21 BY MR. HINKLE:
 22 Q Mr. Klein, you referred a couple of times to the
 23 primary drinking water standard as the standard by
 24 which the water will be treated before it is used
 25 for recharge, is that right?

1 **A Correct.**
 2 Q Is it correct to say that that's the -- the best
 3 quality of water that is required or evaluated by
 4 government standards for any use?
 5 **A Correct. That is correct. That is the drink -- the**
 6 **standard that all public water supplies must meet**
 7 **for protection of public health and public interest.**
 8 Q Based upon your knowledge of the various uses of
 9 water that exist within the area affected by this
 10 project, are there any uses of which you are aware
 11 that would be affected by any change of the quality
 12 of water that would be -- that would be created by
 13 using that primary drinking water standard as the
 14 recharge water level?
 15 **A That recharge water level -- recharge water quality**
 16 **will not adversely affect the current uses. Some**
 17 **areas may experience an improvement in the water**
 18 **quality on certain parameters.**
 19 Q Thank you.
 20 HEARING OFFICER POPE: Mr. Rolfs?
 21 EXAMINATION
 22 BY MR. ROLFS:
 23 Q Just one question. You mentioned that this project,
 24 I believe, would have four recharge wells and two
 25 recharge basins, is that correct?

1 **A Correct.**
 2 Q But at some point you're indicating you changed the
 3 recharge basin into a recharge well, but you still
 4 have two recharge basins after that?
 5 **A Correct. That was the revisions in the application,**
 6 **land ownership issue.**
 7 MR. ROLFS: Okay. Thank you.
 8 HEARING OFFICER POPE: Mr. Bagley.
 9 EXAMINATION
 10 BY MR. BAGLEY:
 11 Q I want to go back to the issue of bank storage
 12 wells. We're talking about the issue of atrazine
 13 and whether or not you would use upper screens or
 14 lower screens. I guess my question is, part of that
 15 is also dictated by whether you can demonstrate the
 16 bank storage water is actually removed using the
 17 lower screens as opposed to the upper screens, is
 18 that not --
 19 **A That is correct.**
 20 Q So that is also a factor, and if the -- so you've
 21 got to balance both, is that correct?
 22 **A That is correct. And until the wells are installed,**
 23 **you -- you have to put the wells in to prove it.**
 24 MR. BAGLEY: Okay.
 25 EXAMINATION

1 Q And then are there other constituents in the water
 2 for which the same thing is true?
 3 **A We've -- based on the water quality data collected**
 4 **to date by USGS there are no other parameters where**
 5 **we have any quality issues, or compliance issues.**
 6 Q Okay. Now, in regard to the actual recharge of the
 7 water, after it's diverted and treated to meet those
 8 primary drinking water standards -- I think that
 9 I've used your terms correct.
 10 **A (Nodded head up and down.)**
 11 Q Can you describe -- I want to distinguish here,
 12 because I understand that there is regulation of
 13 this project also by the Kansas Department of Health
 14 and Environment, so I'm not wanting to necessarily
 15 go into areas that I believe will be certainly
 16 regulated by that department, but what -- can you
 17 just describe generally, if it's appropriate for
 18 you, what type of regulatory provisions you will
 19 need to comply with for the Kansas Department of
 20 Health and Environment? Are there other permits or
 21 approvals for any aspect of this project?
 22 **A There are other permits and approvals that are in**
 23 **process, but no criteria, no water quality criteria**
 24 **has been given to us by KDHE at this time.**
 25 Q But there are later approval steps that you will --

1 BY HEARING OFFICER POPE:
 2 Q Mr. Klein, I have a couple of questions, and if any
 3 of these are ones that you believe the later
 4 witnesses will be more specifically addressing, just
 5 tell me so we don't have to be redundant here.
 6 You've testified to some degree here about the water
 7 quality aspects of the project. Can you tell me a
 8 little bit more specifically what water treatment
 9 facilities are planned to be constructed as a part
 10 of this phase of the project? You discussed
 11 treatment for arsenic, I believe.
 12 **A Correct.**
 13 Q Well, so, then all of the water that will be
 14 withdrawn from bank storage wells will be run
 15 through a treatment plant and treated for then
 16 arsenic? Is that what I understand?
 17 **A Be more than likely a blend. A portion of that**
 18 **water will be treated and a portion won't be, so the**
 19 **blend of water will produce a recharge water that**
 20 **meets the primary drinking water standard.**
 21 Q Okay. And are there other --
 22 **A One that --**
 23 Q Sorry.
 24 **A One that complies with the primary drinking water**
 25 **standard.**

1 **A Yeah.**
 2 Q -- be taking in that regard?
 3 **A Yeah. The city is in the process of taking -- of**
 4 **issuing applications, and I believe those**
 5 **applications have been issued or are under peer**
 6 **review.**
 7 Q And those would be specifically related to what
 8 water can be used for drinking water supplies or
 9 what water can be injected or --
 10 **A Classified injection permit.**
 11 Q Classified injection permits? That would be for
 12 each of the wells.
 13 **A Correct.**
 14 Q Recharge wells.
 15 **A Correct.**
 16 Q And some of the water from this project -- this
 17 proposal here involves the withdrawal wells but also
 18 the, what, four recharge wells, correct?
 19 **A Correct.**
 20 Q There's also been mention of the two recharge pits
 21 that were established as a part of the demonstration
 22 project?
 23 **A Correct.**
 24 Q And this project would propose to also use those.
 25 **A These will be two new recharge basins.**

1 Q Oh. Two new recharge basins are proposed.
 2 A **Here in these two locations (indicating). The**
 3 **Halstead diversion site had a recharge basin here,**
 4 **and then the Sedgwick site had three recharge**
 5 **basins. So these are two new recharge basins.**
 6 Q And so -- but are the existing original recharge
 7 basins also going to be available for use or
 8 proposed to be used as far as this part?
 9 A **Not in this phase.**
 10 Q Not in this phase.
 11 A **Possibly in the future.**
 12 Q Possibly in the future. And then -- so there will
 13 then be the two new recharge basins that are being
 14 proposed as a part of this project.
 15 A **Correct.**
 16 Q I'm sure that's got to be in here. I just want to
 17 make sure I understand.
 18 A **Yeah. Right. The recharge techniques are for**
 19 **recharge recovery wells one, two, three, and then**
 20 **that is now a well, and then these two basins.**
 21 Q Okay. And the provisions that you described earlier
 22 would apply to these recharge basins as well --
 23 A **Correct.**
 24 Q -- in regard to all quality aspects.
 25 A **Be the same one.**

1 HEARING OFFICER POPE: I don't believe I
 2 have any further questions. Do you -- just a
 3 second. Mr. Adrian, do you have a follow-up
 4 question?
 5 MR. ADRIAN: I would like to, if it would
 6 be permitted.
 7 HEARING OFFICER POPE: Yes.
 8 RE-CROSS-EXAMINATION
 9 BY MR. ADRIAN:
 10 Q Mr. Klein, I'm referring to the Memorandum of
 11 Understanding right now, and on issue eight, which I
 12 don't expect you to recall, but it had to do with
 13 water quality, the commitment of the city and the
 14 GMD in that regard was that the quality of the
 15 recharge water injected into the aquifer through the
 16 proposed ASR wells will meet drinking water
 17 standards and will not degrade the ambient use of
 18 water in the basin storage area.
 19 Now, those could be two different things,
 20 likely will be two different measures, will they
 21 not?
 22 A **I believe there was -- there's something -- or was**
 23 **there something about beyond an economic --**
 24 Q Well, it's not written into that commitment.
 25 A **Well, the primary water that is treated will meet**

1 **primary drinking water standard, will not negatively**
 2 **impact the ambient quality of the water, water uses**
 3 **in the area. Now, the do-nothing alternative which**
 4 **allows the chloride pollution, contamination, to**
 5 **migrate into the well field area will have a**
 6 **dramatic negative impact on the current water uses**
 7 **in the area. That's one the city can more easily**
 8 **deal with through -- at the water plant, but not one**
 9 **that maybe the other -- the general public can deal**
 10 **with on a --**
 11 Q I certainly agree with your last statement, that
 12 that plume poses a great problem, but I -- in view
 13 of this commitment, I was just curious from a
 14 technical standpoint how you're going to meet that.
 15 In other words, how you are going to -- what this
 16 says to me is that the standard that the injection
 17 water has to meet is one or the other, either
 18 drinking water standard or the ambient water
 19 standard, if that is different, unless -- or a
 20 higher quality.
 21 A **That would be an issue better addressed by the city**
 22 **and the -- ultimately the regulators.**
 23 MR. ADRIAN: Very well. Thank you.
 24 EXAMINATION
 25 BY MR. ROLFS:

1 Q I believe you said that you were required to get I
 2 think classified injection well permits from KDHE
 3 for the four injection wells. Do they also regulate
 4 the recharge pits?
 5 A **It's my understanding that those aren't regulated,**
 6 **but the requested information and information on the**
 7 **recharge basins or pits has been submitted.**
 8 MR. ROLFS: Okay.
 9 EXAMINATION
 10 BY HEARING OFFICER POPE:
 11 Q And did I understand you, Mr. Klein, to say that you
 12 would anticipate some additional testimony from the
 13 city addressing these points regarding the questions
 14 that Mr. Adrian asked?
 15 A **Yes, sir.**
 16 HEARING OFFICER POPE: I don't believe I
 17 have any further questions. Thank you very much.
 18 Mr. Hinkle, are you ready for your next
 19 witness?
 20 MR. HINKLE: Yes. Thank you. I would
 21 call to -- the next witness is Jerry Blain.
 22 HEARING OFFICER POPE: Do you want the
 23 microphone?
 24 GERALD T. BLAIN,
 25 called as a witness, having been first duly

1 sworn, testified as follows:

2 DIRECT EXAMINATION

3 BY MR. HINKLE:

4 Q Mr. Blain, would you please state your full name and
5 give us a brief accounting of your education and
6 experience in water -- dealing -- that relates to
7 water supply and distribution.

8 A My name is Gerald T. Blain. I'm a licensed
9 professional engineer with the state of Kansas.
10 I've worked for the Wichita water and sewer
11 department for over 29 years. During that time,
12 I've worked as water supply production pumping
13 superintendent and now currently working as water
14 supply projects administrator for the city of
15 Wichita.

16 Q Mr. Adrian has already identified you also as a
17 board member for Groundwater Management District
18 Number 2, is that correct?

19 A Yes, that's correct.

20 Q And what are your responsibilities there?

21 A I've been a member of the GMD board since
22 approximately 1992, I believe. Elected in '93.
23 Have served as the city's representative on that
24 board during that time frame. Have also worked with
25 the --

1 exist. Establish what the quality of that source
2 waters would be. Determine what the impact to the
3 aquifer would be if we recharged those source waters
4 into the aquifer. Evaluate various recharge methods
5 and techniques to see if they were viable
6 alternatives for recharging the aquifer, and then
7 also to develop the data to support the permit
8 requirements that we knew would be needed both by
9 Division of Water Resources, KDHE and other
10 agencies.

11 Q I take it from your comment that the concept of bank
12 storage water was not one that was well, or at least
13 previous -- or possibly even previously recognized?

14 A It was not a concept that was recognized as a
15 individual water resource. At the same time that
16 the city of Wichita was beginning to look at its
17 water supply alternatives in '92, the Groundwater
18 Management District was also doing some management
19 alternatives to deal with water usage along the
20 Little Arkansas River. What brought us to that
21 conclusion to look at bank storage was testimony we
22 heard when we were evaluating management techniques
23 along the Little Arkansas River, because what was
24 recognized is the aquifer discharged into the --
25 into the river. And so we were, as part of the GMD,

1 HEARING OFFICER POPE: Excuse me.

2 A -- city of Wichita on another --

3 HEARING OFFICER POPE: Can we check and
4 make sure your mic is coming through as well as it
5 can. It may not be on.

6 A I've also been involved with the city of Wichita in
7 working with Cheney watershed protection project
8 working with farmers and producers in that watershed
9 to reduce pollution and extend the life of the --
10 that water source.

11 Q Would it be correct to say that both in your
12 capacity as an employee of the city of Wichita and
13 as a GMD2 board member you are acquainted with and
14 have had significant roles to play in the
15 demonstration project and the application that is
16 currently before the division?

17 A Yes, that's correct.

18 Q What would you say are the main components and goals
19 of the city's aquifer demonstration project?

20 A The demonstration project was a five-year project.
21 Its main goals were to establish if source water
22 could be captured from the Little Arkansas River.
23 And by source water we were looking both at what we
24 call bank storage water and direct surface intake.
25 Verify that this bank storage concept worked and did

1 working to develop ways to control water usage along
2 the river to make sure that the aquifer could still
3 discharge to the river and be considered as a usage
4 of the aquifer. We heard testimony from a number of
5 people located along the river that there wasn't any
6 need to do something like that because every time it
7 rained their water levels went up in their wells.
8 We pursued that concept a little bit more, seeing if
9 perhaps that did occur, that the river did influence
10 groundwater levels temporarily. And if that did
11 happen, whether or not that was a viable resource to
12 capture. What the farmers and producers with wells
13 who did that, they benefited by lower pumping costs
14 and things like that, but the specific event, if you
15 will, when the water levels rose in the wells, had
16 not been determined to be an independent water
17 resource that could be captured. And since all the
18 conventional water resources in the Little Arkansas
19 River were already allocated to somebody else, we
20 were looking at whether or not that component as
21 well as excess flows in the river could be captured
22 as a water resource.

23 Q And did your demonstration project determine that
24 such excess flows were in fact a resource that could
25 be captured? And, if so, how did you determine that

1 to be the case?
 2 A What we did is we built a demonstration well,
 3 pumping well, and sited it adjacent to the river.
 4 We then surrounded that well by an extreme number of
 5 monitoring wells. I believe there was a total of
 6 over 18 monitoring wells, deep and shallow, located
 7 around that diversion well. The sole purpose of
 8 those wells was to determine if bank storage
 9 occurred, and if, while pumping, you could capture
 10 that bank storage event while it occurred, and what
 11 impact it would have if you pump that water to
 12 adjacent water levels.
 13 Q What did you find from the sampling that you did
 14 through those wells?
 15 A We determined that bank storage events did occur,
 16 not only at the site we were at but several other
 17 sites we put monitoring wells in, and that we could
 18 capture that water. If I can refer to Exhibit DD,
 19 which is displayed behind you. This is a hydrograph
 20 that occurred in -- while we were using this, and
 21 what you can see here, the top line here represents
 22 river levels, and the lower lines here represent
 23 various ground water levels. Two of these are
 24 fairly close to the river. The red line is
 25 significantly further away from the river.

1 And I might want to point out one difference
 2 here. Under normal occasions, the black line here
 3 would actually be lower than the water levels that
 4 we'd be measuring in the aquifer, but this -- the
 5 gage that we used to measure the river was actually
 6 upstream about two miles from this site so,
 7 therefore, it looks artificially higher than
 8 actually occurred, but what it does show is the time
 9 event when the rainfall events and excess flow
 10 events occurred in the river. You can see we had an
 11 event here early in the year. River went up. We
 12 turned on the pump, and we had a cone of depression
 13 form, not a very significant cone of depression, but
 14 when we stopped pumping, ground water levels before
 15 and after pumping were about the same. We then had
 16 a much more significant rainfall event happen later
 17 in the year. This is September. We turned on the
 18 pump on this date, and we formed a cone of
 19 depression. We actually turned off the pump at this
 20 date, in December. What you can see is there were
 21 several significant flow events, but you can also
 22 see here we formed a cone of depression but water
 23 levels rose in the well while it was pumping. We
 24 formed another cone of depression for a period of
 25 time, and then another major flow event occurred and

1 again water levels rose in the well while the well
 2 was pumping. In fact, at this point in time here,
 3 water levels in the well were almost 10 feet higher
 4 than they were under baseline conditions. So at
 5 this point in time, you know, on both of these
 6 occasions, again, that is not what you will see when
 7 you operate a well. You would normally see
 8 something like that where you have a cone of
 9 depression while the pump is operating, you shut off
 10 the pump, the cone of depression disappears. In
 11 this case, rather than have a cone of depression, we
 12 actually have the increase in water levels in the
 13 well. We shut off the well at this point in time.
 14 It quickly restored. And as you can see, water
 15 levels at this point in time are three feet higher
 16 than they were at this point in time. You see the
 17 well furthest from the river did not respond near as
 18 fast to water level changes, but it did eventually
 19 respond to the changes of flow in the river, and it
 20 also ended up several feet higher than it was at the
 21 baseline. We started pumping here on
 22 September 23rd, and that's 1998. We ended pumping
 23 here on December 17th. During that time frame we
 24 pumped for 86 consecutive days. We pumped
 25 117 million gallons of water, and at the time frame

1 when we stopped pumping, water levels were
 2 three feet higher than we were before we started.
 3 That is the perfect epitome, if you will, of what we
 4 wanted to demonstrate through these bank storage
 5 wells, is that a well could pump, divert river
 6 water, and that it would have no impacts on the
 7 adjacent groundwater around it and no prejudicial
 8 impact, so that is the definitions you are attaching
 9 bank storage water through here, that we captured it
 10 and again demonstrated that there was no negative
 11 impacts, and as you can see, the water -- river
 12 levels were still higher than baseline, but we had
 13 to shut off the well for weather conditions and
 14 stuff. But we could have kept pumping considerably
 15 longer because this flow in the river is higher than
 16 the baseline that we would use to turn on a well in
 17 a normal case. So the primary intention of showing
 18 these base water -- these bank storage monitoring
 19 systems was to determine that bank storage could be
 20 captured and that there would be no negative impacts
 21 on any surrounding groundwater users because the
 22 river water replaced all the water that was pumped
 23 from the bank storage well.
 24 Q Did you also determine there was a positive effect
 25 on water quality through the bank filtration?

1 A We determined there was a change in the water
 2 quality in the bank storage well. We particularly
 3 wanted to track conductivity, which is a measure of
 4 water quality, but usually there's a difference in
 5 the conductivity levels in groundwater and surface
 6 water. And what we found as we pumped this well is
 7 that the conductivity of the water we pumped
 8 changed. It took on a blend, if you will, of
 9 surface water and groundwater, which what that
 10 indicated to us is that the water in the river was
 11 migrating into the aquifer and replacing the aquifer
 12 water we were pumping. We also observed that the
 13 atrazine levels as previously mentioned in the river
 14 were significantly higher than they were in the
 15 native groundwater and that those atrazine levels
 16 did not change over time, meaning that the bank
 17 filtration technology or technique that was
 18 happening there was -- provided treatment on that
 19 atrazine. It's as if the -- each bank storage well
 20 essentially can be like a little mini water
 21 treatment plant by removing the turbidities and
 22 other contaminants in the river, including atrazine,
 23 and then the water that you pump out of the well,
 24 then, is ready to be recharged.
 25 Q If the bank storage well was not capturing water

1 from the river, what would you have expected to have
 2 seen?
 3 A What we would have seen is if the water levels as
 4 monitored around the well would decline over time,
 5 especially since it was already determined the
 6 water -- groundwater discharges to the river, if we
 7 took groundwater out of there, we would have seen
 8 significant and very measurable changes in
 9 groundwater levels around the well.
 10 Q And you saw nothing of the sort, then.
 11 A We saw nothing. In fact, we saw that water levels
 12 still improved even though we were pumping and
 13 definitely the baseline water levels did not
 14 deteriorate through considerable operation of the
 15 wells. What is important is that the well has to be
 16 operated when there's water there. In this case an
 17 excess flow event in the river must occur in order
 18 for us to capture that water, because if there is
 19 not water in the river to replace what we pump, then
 20 the groundwater levels will deteriorate. It will
 21 also affect the flow in the river.
 22 Q The data you obtained from monitoring, was it used
 23 in any way to craft the regulations to administer
 24 this project?
 25 A Yes. Because the things we observed and the number

1 of monitoring wells we had around there did give us
 2 actual measurable quantities and conditions that
 3 could be replicated at other sites, so those
 4 measurable components became part of regulations
 5 defining the operation of bank storage wells.
 6 Q And who promulgated those regulations?
 7 A Those regulations were promulgated by the Division
 8 of Water Resources and also by the Groundwater
 9 Management District that were later adopted by the
 10 Division of Water Resources.
 11 Q Mr. Blain, there was a claim during the
 12 demonstration project that certain trees located
 13 near one of the recharge basins were killed by the
 14 project. Is that what happened?
 15 A While we were recharging water at one of the
 16 recharge sites where it was actually recharging
 17 water from the surface water diversion near Sedgwick
 18 we observed a row of trees adjacent to one of the
 19 basins dying. At that point in time, I contacted
 20 the U.S. Geological Survey, had them come out and
 21 sample water quality, groundwater quality, in the
 22 tree line. We actually had monitoring wells already
 23 in place there. And had an arborist who worked for
 24 the city of Wichita come out and look to see if they
 25 could determine the cause of the trees' condition.

1 The U.S. Geological Survey tested the groundwater
 2 and found nothing in the groundwater, no pesticides
 3 or anything else that would relate to death of the
 4 trees. The arborist we had look at it determined
 5 that he thought that they were killed by a herbicide
 6 or something, but -- from the surface, so at that
 7 point in time we proceeded knowing that we felt
 8 confident that we had not caused a problem with the
 9 trees with the recharge activities. Approximately a
 10 year and a half, two years later, there was another
 11 public interest in why the trees died. I gave that
 12 information. There was some dissatisfaction that
 13 that answer was complete. We contacted the Kansas
 14 Department of Health and Environment and they worked
 15 with the Equus Beds Groundwater Management District
 16 staff, had investigators come out from the Kansas
 17 Department of Agriculture and Kansas State Forestry.
 18 They looked at the trees. They wrote an
 19 investigation that essentially said that the trees
 20 were killed by a surface applied herbicide and not
 21 related to any of the recharge activities that
 22 occurred at that site.
 23 Q And the K-State report that relates to this is in
 24 the record as Exhibit CC, is that correct?
 25 A That's correct.

1 Q Why did the city select the sites that were included
 2 in the applications?
 3 A The sites were picked primarily because of the
 4 chloride contamination that exists. You can see on
 5 this Exhibit, which is Exhibit Y, this shows a
 6 depiction of the chloride plume that occurs -- is
 7 occurring now. That's in the middle zone. We also
 8 have exhibits for the shallow zone and the deep
 9 zone. This is near the Burrton area. This is
 10 probably -- the highest concentrations here are
 11 probably the source of most of the chlorides. As
 12 you can see, it has expanded significantly. This
 13 line right here represents 400 parts per million
 14 chlorides. Well in excess of the 250 parts per
 15 million chlorides that exist or are a part of the
 16 drinking water standards. These six sites you see
 17 here are the recharge sites. These are the three
 18 recharge recovery wells, the recharge well, and then
 19 two basins. And the water is coming from the river
 20 over here. The reason we picked these six sites is
 21 to begin the formation of the hydraulic barrier to
 22 try to keep that plume from moving any further. As
 23 you can see, in some cases it's less than a mile, in
 24 fact, less than a quarter of a mile from the
 25 recharge sites we have selected. And so that's why

1 it's imperative that we put -- start that hydraulic
 2 barrier, because if we don't start it recharging
 3 before the plume goes past, then we will not
 4 accomplish anything, so that's why we selected these
 5 locations solely on the basis of forming a hydraulic
 6 barrier. You can also see right here, these are the
 7 chloride contamination coming from the Arkansas
 8 River, which is south of here. This is the 250
 9 parts per million line for that. So you can see
 10 that plume also is moving into our well field as
 11 depicted on here.
 12 Q Mr. Blain, what's the status of the city's right to
 13 access to the six sites that you have mentioned?
 14 A At this point in time the city has either obtained
 15 contracts or received letters that -- of acc -- of
 16 intent from the property owners from all the sites
 17 stating that they will either sell us the sites or
 18 they're willing to sell us access to the sites, both
 19 for recharge sites and also for the diversion sites
 20 along the river. So at this point in time I believe
 21 I can say that the city has acquired property owner
 22 intent to sell or contracts from all sites included
 23 in this project, which is -- was one of the issues
 24 included in the purpose for the hearing.
 25 Q You're referring to the prehearing order, is that

1 correct?
 2 A Yes, uh-huh.
 3 Q Is it correct to say that since that prehearing
 4 order was developed that the city's acquisition
 5 efforts have continued?
 6 A Yes.
 7 Q And, in fact, moved significantly ahead, is that
 8 correct?
 9 A Yes.
 10 Q Like I say, I believe at this point there might be
 11 only three property owners we don't actually have
 12 the signed contract on, but they've got contracts in
 13 front of them and we're negotiating with them, but
 14 all three of those owners have also given letters of
 15 intent to sell.
 16 MR. HINKLE: Mr. Pope, I would offer at
 17 this time revised City Exhibits KK and LL. The ones
 18 currently in the record reflect the city's
 19 acquisition rights at the time when those exhibits
 20 were submitted. The new exhibits or the revised
 21 exhibits would show the acquisition rights as they
 22 stand today. And I have five copies available for
 23 distribution if you like.
 24 HEARING OFFICER POPE: Why don't you go
 25 ahead and make that distribution. These would be

1 essentially revised -- or substitute for the ones
 2 previously submitted?
 3 MR. HINKLE: That's correct. They'll
 4 have all the information shown on existing KK and
 5 LL, and update the information that's contained
 6 there to show acquisition rights by either ownership
 7 or letters of intent for all the properties now.
 8 HEARING OFFICER POPE: Mr. Hinkle, before
 9 we go forward here, let me -- would it be more clear
 10 for the record since we have an existing --
 11 apparently we have an existing KK and LL in our
 12 materials, if we just gave these new numbers, and
 13 then you could make clear for the record that these
 14 were the updated versions?
 15 MR. HINKLE: Certainly. That's fine.
 16 HEARING OFFICER POPE: Can you tell me,
 17 one of you, what the last existing city number is,
 18 then? So what would be the new number if we did it
 19 in sequence?
 20 MR. LANG: Mr. Pope, these would be MM,
 21 Mike Mike.
 22 HEARING OFFICER POPE: So MM would be a
 23 substitute for KK and LL. Is there two documents or
 24 one or --
 25 MR. HINKLE: Actually KK and LL have

1 attachments to them and those are not included in
2 this substitute document, so I think your suggestion
3 that we just have it as a separate Exhibit MM works
4 best.

5 HEARING OFFICER POPE: Okay. And you're
6 offering that at this point in time. Let me ask,
7 Mr. Adrian, do you have -- does the district have --
8 have you had a chance to look at this sufficient to
9 know if you have concerns?

10 MR. ADRIAN: Actually, I have no concern,
11 but I would like a little time to look at it before
12 I simply say I agree.

13 MR. HINKLE: That's fine. I mean, this
14 is obviously the first time I've handed it to him.

15 HEARING OFFICER POPE: Let's defer the
16 decision on admission until later, but remind me if
17 we don't get that dealt with perhaps before
18 Mr. Blain's testimony is over or at least later.

19 MR. HINKLE: Thank you.

20 Q Mr. Blain, the division of water resources has
21 established a number of regulations that help define
22 the requirements for approving application to
23 acquire water appropriation, in particular water
24 appropriation for aquifer storage and recovery
25 project. And these are the regulations you've just

1 described as having been developed through the data
2 you obtained in the monitoring of the demonstration
3 project.

4 Can you discuss how the city of Wichita has
5 complied with all the requirements and intents of
6 the rules and regulations of the Division of Water
7 Resources?

8 A Yes. If I can, what I'd like to do is maybe go
9 through the regulations and read excerpts of them
10 and then kind of say how we've complied with those
11 excerpts, if that's okay with Mr. Pope.

12 HEARING OFFICER POPE: (Nodded head up
13 and down.)

14 A Actually most of these fall under K.A.R. 5-12-1
15 which deal specifically with aquifer recovery
16 permitting. Issue A says: An operator may store
17 water in an aquifer storage and recovery system
18 under a permit to appropriate water for artificial
19 recharge if the water appropriated is source water.
20 And the requirement under Article 12 in the rules
21 and regulations adopted by the Kansas Department of
22 Agriculture do not in any way change the
23 requirements of Kansas Department of Health and
24 Environment concerning underground injection wells.
25 Section B says: Each application for a permit to

1 appropriate water for artificial recharge shall
2 describe the horizontal and vertical extent of the
3 basin storage area in which the source water will be
4 stored, and piece one of section B is that the
5 horizontal extent shall be determined by a closed
6 boundary within which the recharge system used to
7 store water will be physically located. The
8 recharge system may include recharge pits, recharge
9 trenches, recharge wells or other similar systems
10 that cause source water to enter the recharge volume
11 of the basin storage area either by gravity flow or
12 injection. The basin storage area may be subdivided
13 into smaller areas representing the areas that may
14 be recharged by the individual recharge system.

15 To meet the requirements of that, those
16 sections, the city has utilized data provided by the
17 USGS to identify the basin storage area. USGS water
18 resources investigation reports 03-4298 titled
19 status of groundwater levels and storage volumes in
20 the Wichita well field area South Central Kansas
21 2000-2003, which is also Exhibit E. Maybe I should
22 have said it's Exhibit E. Provides both
23 predevelopment water levels that existed in 1940 and
24 the historic low water levels which occurred in
25 October of 1992. The city has also identified in

1 the applications the horizontal boundaries of the
2 storage area. Those are delineated in the
3 applications. The city will use recharge wells and
4 recharge basins to put source water back into the
5 aquifer. The city has recommended that the basin
6 storage area also be broken into smaller areas that
7 can be more closely monitored and administered.
8 We're recommending 38 smaller cells, each
9 approximately four square miles in size to help
10 administer the project grid. That methodology and
11 that size was determined with the aid of the
12 Groundwater Management District and also the Kansa
13 Geological Survey as an accounting methodology that
14 they have confidence in. We've chosen and
15 recommended the January 1993 water levels to be used
16 to establish the bottom of the basin storage areas,
17 which are actually slightly higher than the
18 October 1992 levels which are the historic low
19 levels. Section 2 of that portion goes on to state:
20 The vertical extent shall be defined by a minimum
21 and maximum index water levels for the basin storage
22 area, or for each subdivided area within the basin
23 storage area if the basin storage area is
24 subdivided. The minimum index water level shall be
25 the lowest water level within the basin storage

1 area, or smaller subdivided area, if so subdivided,
2 that occurred within the 10 years before the filing
3 of the application for a permit to appropriate
4 water, or a period of time longer than 10 years
5 demonstrated by the applicant to reflect the lowest
6 water levels. If the basin storage area is
7 subdivided, the measurements from the same year
8 shall be used to determine the minimum index water
9 level for each subdivision.

10 The city believes the USGS data is more than
11 adequate to establish the historic low water levels.
12 The city has provided maps and tables that depict
13 the minimum water levels for each of the cells in
14 the project area as part of the applications. And
15 you'll also hear some more details about that later
16 within the discussion on the model. But we believe
17 that description does fit the requirements of
18 defining the minimum levels.

19 The regulations go on to state that the
20 maximum index water level shall represent the
21 maximum storage potential for the basin storage
22 area. The city is willing to accept the measured
23 water levels in 1940, which were obtained prior to
24 significant groundwater development in the area as
25 the maximum storage potential in the basin storage

1 increased by over 20 feet in this area since 1992.
2 And the only reason, really, that has increased is
3 because of the reduction of water use from the city
4 from what is -- okay, this is -- again, you can see
5 this is the 20-foot area, all this area, the lighter
6 blue is also increasing water levels. What this
7 indicates, though, is that the water levels in this
8 aquifer can be restored simply by reducing
9 consumption from the aquifer. There does not need
10 to be a recharge project, and I think it also
11 prove -- obviously shows that if you reduce
12 consumption to match the complete state of yield in
13 the area that water levels could return by
14 themselves to the 1940 levels, so therefore
15 restoring the project to those historic levels is a
16 restoration, not an unreasonable rise of the water
17 table. And this demonstrates that the -- and the
18 only reason that that will be considered an
19 unreasonable raising of the water table is if the
20 division is willing to declare that dewatering the
21 aquifer is a desirable condition, because that's
22 essentially what -- if you're going lower than 1940,
23 you're saying you want to be kept at a dewatering
24 condition.

25 Q Mr. Blain, can you describe what perched water is

1 area. However, it should be noted that 1930s was a
2 period of excessive drought and that the water
3 levels in 1940 were probably lower than the actual
4 maximum storage capacity of the aquifer, because the
5 aquifer wouldn't have had time to fully recover from
6 what could be considered one of the most cataclysmic
7 droughts in the nation's history.

8 Issue number five of the hearing orders asks
9 that the recommendations of the GMD are adequate to
10 assure that the project will not damage the
11 landowners in the project area from unreasonable
12 raising of the water table.

13 The maximum elevation selected for this
14 project clearly demonstrate that the project will
15 not unreasonably raise water tables -- water levels
16 but will merely be restoring historic water levels
17 and not raising water levels to levels that did not
18 occur naturally. There are -- these are the same
19 elevations that would be obtained if water
20 consumption from the area were reduced. An example
21 of that occurs -- is shown in figure 23, Exhibit E,
22 and unfortunately it's a little harder to see this
23 map, but this is from the USGS. What's important
24 here is the blue colors you see here are changes in
25 water levels that show that water levels have

1 and how perched water in this area would be affected
2 by this project.

3 A Yes, I can, if I use the next exhibit here. Perched
4 water is actually still formed by surface water just
5 like the water that recharges the rest of the equus
6 beds is, but generally what happens is the water is
7 trapped between the soil and the shallow impermeable
8 layer, usually clay, located below the soil. And
9 where there's perched water in the equus beds,
10 there's actually usually two water tables. In index
11 well two, and I'm afraid this is not going to show
12 up as well as I want it to because of the size. We
13 have a shallow and a deep well at that index well.
14 The shallow well is screened in this portion of the
15 aquifer, the deep well is screened in this portion
16 of the aquifer. And what we've got there in the
17 shallow well, the water table is here, approximately
18 nine feet below ground level. In the deep well, the
19 ground level is here, approximately 35 feet -- and
20 that's on the same exhibit here. I don't know if
21 you can see these, but this is where the groundwater
22 level is in the shallow well which is screened here,
23 this is the groundwater level in the deep well.
24 This well over here is a recharge/recovery well,
25 test well we drilled -- and, again, this -- the test

1 well was screened down here. Here's the water level
2 here. You can see it matches the water level at the
3 index well.

4 What is happening is there's an intermittent
5 clay layer through here, which you can see in the
6 geologic information, and it perches that water up
7 there. We are going to be recharging the deeper
8 portion of the aquifer. We'll be charging down
9 here. We're wanting to raise this water level, and
10 it actually can go up 20 feet to match where it was
11 in 1940, predevelopment level. So by recharging
12 this level here, we are not affecting this level
13 here because they are completely separate at some
14 locations in equus beds. It does not occur
15 universally, but in some of the area near where
16 these recharge sites are located, perched water does
17 occur, and I'm sure the -- even the residents out
18 there have observed that when the irrigation wells
19 are on, the perched water levels don't change.
20 That's an indication that the water that's being
21 pumped in the irrigation wells is not dewatering
22 that level, because if it was, there would not be
23 the perched conditions that are out there.

24 HEARING OFFICER POPE: Mr. Blain, I want
25 to interrupt for a second. I don't believe it was

1 stated for the record which exhibit you're referring
2 to here, and also if you could in your testimony
3 distinguish between city exhibits and DWR exhibits,
4 because they're both using letter systems.

5 A Okay. I do not know the exhibit on there -- you
6 have an exhibit number on this one?

7 MR. HINKLE: Okay. Mr. Pope, we've
8 currently been looking at City Exhibit -- city of
9 Wichita Exhibit EE, as in Edward Edward.

10 A As the irrigators have pumped out of that deeper
11 aquifer, the perched water table where it exists in
12 that neighborhood is not affected because the water
13 does not obviously get down to this level because of
14 the intervening clay layer. It does not occur
15 universally but does happen in some cases, and
16 that's also why some of the recharge basins that
17 we're looking at, if we think we've got an
18 intervening clay layer we'll be putting in what
19 we're terming passive wells that will allow our
20 water to go down to the deeper aquifer and not get
21 perched on the intervening clay layers if that
22 appears to be the case at a recharge basin.

23 Q Mr. Blain, would you give your attention to
24 regulations 5-12-1, Subsection C.

25 A Yes. That section states that an application for a

1 permit to appropriate water for artificial recharge
2 shall set forth the maximum annual quantity and
3 maximum rate of diversion of the source water. The
4 city in its applications requested 1,500 acre feet
5 of water with a maximum withdrawal rate of 1,200 to
6 1,500 gallon per minute for each of the seven
7 diversion wells. This would provide up to 10,500
8 acre feet of water for recharge during very wet
9 years. The MOU subsequently agreed to by the city
10 and the GMD in the test with staff recommendations
11 has recommended that the maximum withdrawal rate of
12 1,000 gallons per minute per well, so those
13 quantities identified in Section C are included in
14 the applications.

15 Q And now regulation 5-12-1, Subsection D, 1 and 2.

16 A That section states that each application for a
17 permit to appropriate water for artificial recharge
18 shall include a methodology for accounting for water
19 stored in a basin storage area both on an annual
20 basis and on a cumulative basis so that recharge
21 credits can be calculated. And it also states that
22 if there's more than one application the same
23 methodology has to be used for both -- all systems.
24 The accounting of the water balance of all water
25 entering and leaving the basin storage area shall be

1 determined by using sound engineering methods based
2 on actual measurements or generally accepted
3 engineering methodology or a combination of both.

4 And section two goes on to say that approval
5 of any application for a permit to appropriate water
6 for artificial recharge shall be contingent upon the
7 chief engineer's approval of the method for
8 accounting in the basin storage area.

9 The city offers to use a computer model that
10 utilizes the MODFLOW model originally constructed
11 and created by the U.S. Geological Survey to account
12 for the water balance in the basin storage area.
13 The computer model represents the best engineering
14 methodology currently available to account for the
15 water balance in the basin storage area. You'll
16 hear more extensive testimony on the model later.

17 Q And, Mr. Blain, from whom will that testimony come?

18 A Dave Stous shall be providing more information on
19 the actual model.

20 Q Okay.

21 A To assist in the assuring that the validity of the
22 information generated in the model, the city has
23 already installed an index well network, and you
24 heard a little bit about that from Jeff Klein. It
25 was designed with the assistance from Groundwater

1 Management District and KGS. The data stream that
 2 will be collected from that monitoring well network
 3 will allow the model to accurately identify the
 4 water balance in the entire basin storage area as
 5 well as in each of the 38 smaller cells. The model
 6 can track -- can identify and track all the elements
 7 needed to track the water balance within each cell,
 8 and the model represents again the most sound
 9 engineering methodology currently available and is a
 10 generally accepted engineering methodology.
 11 Q Could you now address K.A.R. regulation 5-12-1,
 12 Subsection E.
 13 A Yes. That section states that an applicant for
 14 recovery of water stored in a -- by the holder of a
 15 permit to appropriate water for artificial recharge
 16 to store water in a basin storage area shall obtain
 17 a permit separate from the aquifer storage permit to
 18 appropriate water for beneficial use for each well
 19 used to recover water stored. The maximum annual
 20 quantity of water that may be appropriated for this
 21 purpose shall be no more than the maximum cumulative
 22 recharge credits available to the operator of the
 23 aquifer storage and recovery system. These credits
 24 shall be determined by the accounting methodology
 25 approved under a permit to appropriate water for

1 recharge pertaining to the aquifer storage and
 2 recovery system. In determining whether the
 3 diversion of an annual quantity impairs other water
 4 rights, the following data may be considered by the
 5 chief engineer: One, the maximum storage volume
 6 available in the basin storage area; two, the
 7 spatial distribution of those recharge and
 8 withdrawal systems; three, the maximum rate of
 9 diversion at which water will be withdrawn; and,
 10 four, any other relevant information.
 11 And it goes on to say that recharge credits
 12 can be accumulated over more than one year, and any
 13 amount of recharge credits available may be
 14 withdrawn in accordance with the permit if the
 15 withdrawal does not impair other water rights.
 16 The city believes that the recharge/recovery
 17 well applications fully comply with this component
 18 of regulations. As to the specific items in this
 19 section: Number one, the city has identified the
 20 basin storage capacity of the entire basin storage
 21 area, and the storage capacity of each cell in the
 22 project area; and, two, the city has identified the
 23 location of all the recharge facilities. The
 24 recharge/recovery wells will be installed in the
 25 southwest corner of Section 12, the northwest corner

1 of Section 23, and the southwest corner of Section
 2 24, all in section -- Township 23 south, Range 3
 3 west. The city will also install a recharge well in
 4 the northwest corner of Section 36, Township 23,
 5 Range 3 west, and recharge basins in the northwest
 6 corners of Section 2 and Section 11 of that
 7 township. The wells will be used to recharge the
 8 aquifer, will probably not be used to recover water
 9 stored except for maintenance purposes and other
 10 dire emergencies because of their value in forming
 11 the hydraulic barrier to the chloride contamination.
 12 So while we will have permits, and we need to
 13 have those permits in order to identify creation of
 14 an aquifer storage and recovery system, the city's
 15 best interest is served by not using that water
 16 except when absolutely necessary and for maintenance
 17 purposes.
 18 Q And, Mr. Blain, by maintenance purposes you mean for
 19 the particular wells involved?
 20 A That's correct. Each well, because they are
 21 recharge wells, there's a certain amount of water
 22 that needs to be pumped from the wells to, if you
 23 will, backwash the well, to keep the recharge
 24 capacity of that well up. Item number three of this
 25 section says we've complied with that by stating the

1 maximum withdrawal from the wells will be 1,500
 2 gallons per minute. I also want to state the city's
 3 applications also allow water to be pumped from the
 4 wells only when there are recharge credits available
 5 and water levels are above the minimum water levels
 6 identified for the individual cells. Therefore, the
 7 operation of these wells cannot impair other water
 8 uses because the aquifer will have to be higher than
 9 the base elevation before they can even be operated.
 10 Q And if I understand correctly, that's determined on
 11 a cell by cell basis.
 12 A That is correct.
 13 Q Okay. Would you now address regulation 5-12-1,
 14 Section F, and can we go a little slower? If I were
 15 the reporter, my fingers would be cramping.
 16 A My apologies. Section F states that the approval of
 17 application, if water is to be diverted is water
 18 artificially recharged into the basin storage area,
 19 shall be conditioned upon the following: Number
 20 one: Generally accepted engineering methodology;
 21 number two, a maximum annual quantity that does not
 22 exceed the recharge credits; and, three, an annual
 23 reporting that complies with K.A.R. 5-12-2. As
 24 previously mentioned, the city will utilize a
 25 computer model to address the items in this section.

1 You'll hear more specifics about how that model
2 works from Dave Stous, but it does represent, again,
3 the sound engineering methods based on actual
4 measurements and generally accepted engineering
5 methodology.

6 Q Now, Mr. Blain, there are certain definitions that
7 are included in these regulations, and in the --
8 that pertain to this particular project. They're
9 found at regulation 5-1-1. Would you please address
10 those.

11 A Okay. Some of the pertinent definitions. Item A
12 is -- defines above base flow stage. It means
13 stream flow that is in response to a significant
14 runoff event during which period the water level
15 elevation of the stream is greater than the
16 elevation of the adjacent water table.

17 The city proposes to operate the diversion
18 wells only when stream flow, as recorded downstream
19 at the USGS stream gage at Highway 50, exceed 20
20 cubic feet per second from October through March,
21 and 42 cubic feet per second from April through
22 September. Those figures represent the flow rates
23 that occurred 90 percent of the time and also allow
24 for all downstream water rights to be met. The GMD
25 regulations state that base flow is the flow that is

1 met or exceeded 90 percent of the time.

2 It is also a component of issue number six for
3 this hearing. The use of the USGS gage will assure
4 that the diversion wells will only be operated when
5 the pre-established flow requirements are met.
6 During the demonstration project the city
7 established a link between that USGS gage and the
8 operational computer that locked out the diversion
9 well if there was not an adequate flow available at
10 the gage. A similar link will be established for
11 this project.

12 Q The next definition?

13 A Next definition is item B, which describes
14 acceptable quality surface water means surface water
15 that will not degrade the quality of the groundwater
16 source into which it is discharged.

17 The city is committed in the MOU the quality
18 of the water used to recharge the aquifer will meet
19 all drinking water regulations and will not degrade
20 the ambient use of water in this basin storage area.
21 But you also have to note the do nothing
22 alternative, which will allow salt water plumes to
23 continue to migrate into the area and render the
24 water unusable as a drinking water supply.

25 Of concern to many people has also been the

1 potential to increase arsenic levels in the area
2 because of high arsenic levels in the diversion
3 wells. This next map, if you can give that to me,
4 Don -- and we do not have an exhibit number on this
5 because this map is slightly over 24 hours old, so
6 this is for demonstrative purposes only. This is a
7 map created by USGS data. It is an arsenic
8 concentration map. Again, here you can see this is
9 the recharge first six sites that we're doing. The
10 wells we have are here along the river. Everything
11 in white up here, arsenic is below five parts per
12 billion. The blue color here, it's between five and
13 10. This next shade here, that's called violet for
14 now, is above 10 parts per billion, and the darker
15 colors here are above 15 parts per billion. You can
16 see here these three sites, we will be putting --
17 recharging into an area that is less than five parts
18 per billion. This site will be going into 5 to 10,
19 this site in over 10 and this site over 15 parts per
20 billion. So even if we're looking at this defining
21 the ambient quality in this area, the other dots you
22 see here are the projected recharge sites for the
23 full-scale project. As you can see, arsenic is a
24 significant issue through almost all of Harvey
25 County. This is the county line here. Now, what

1 will happen, even with the initial -- this stage,
2 again, we're recharging up here. Other stages we
3 may be taking water someplace along here and feeding
4 it -- the bank storage water will be recharged here.
5 All of the southern sites, and maybe much of the
6 middle, too, will also be recharged using surface
7 water where the arsenic will not be an issue with
8 that. But I thought this was an excellent
9 opportunity to show that arsenic is a significant
10 existing issue in the areas. Now we're taking
11 arsenic here and moving it to where there is no
12 arsenic. Arsenic does exist through -- in
13 significant concentrations through much of the
14 project area.

15 Q Mr. Pope, if I could add, for the record, that the
16 exhibit we've been looking at is not entirely new.
17 It is Exhibit -- City Exhibit BB, as in boy boy, in
18 the record. The additions for the purpose of this
19 hearing is simply a coloration of the various
20 gradients so that it is easier to see in this type
21 of setting, but the information itself is available
22 on BB.

23 HEARING OFFICER POPE: All right. So
24 that the actual data and the information itself is
25 the same as in BB.

1 MR. HINKLE: That's correct.
 2 HEARING OFFICER POPE: Except for the --
 3 basically the coloring.
 4 MR. HINKLE: That's correct.
 5 **A Well, and also BB does not have the location of the**
 6 **city facility -- recharge facilities on it.**
 7 Q So those are superimposed from other exhibits --
 8 **A Yes.**
 9 Q -- in the record that are available.
 10 **A Right.**
 11 HEARING OFFICER POPE: Mr. Hinkle, did
 12 you intend not to then -- I understand we had some
 13 prehearing procedures in terms of submittal of
 14 proposed exhibits, but are you not -- you're not
 15 proposing to then offer the -- any supplemental
 16 documentation in regard to this one?
 17 MR. HINKLE: If I understand, that
 18 Mr. Adrian is seeing this for the first time. If
 19 you're willing to accept it and if he has no
 20 objection, the city would certainly offer this to be
 21 included in the exhibits.
 22 MR. ADRIAN: I received this yesterday.
 23 Is this the same one you sent me yesterday?
 24 MR. HINKLE: This would be the same one
 25 that was included in Mr. Blain's Power Point that I

1 language out of the MOU, isn't it?
 2 **A That's correct.**
 3 Q Do you know of any ambient use of water in the basin
 4 storage area that demands quality higher than
 5 primary dinking water standards?
 6 **A No, that that is the highest, greatest definition of**
 7 **water is drinking water quality.**
 8 Q You were looking at the -- you were giving an
 9 illustration of how the city's application and the
 10 demonstration project accounts for the definitions
 11 that are found K.A.R. 5-1-1. The next one I want
 12 you to address is 5-1-1(i), bank storage.
 13 **A The bank storage definition says that bank storage**
 14 **means water absorbed by and temporarily stored in**
 15 **the banks and bed of a stream during an above base**
 16 **flow stage. The city has invested a significant**
 17 **amount of resources to document the occurrence of**
 18 **bank storage events along the Little Arkansas River.**
 19 **The city's application for the diversion wells are**
 20 **intended solely to capture bank storage water, and**
 21 **the city believes the monitoring program recommended**
 22 **by the GMD will be adequate to determine if**
 23 **diversion wells are capturing bank storage water.**
 24 **The hydrograph I previously displayed depicted the**
 25 **impact of bank storage and how a diversion well can**

1 sent you by e-mail, yes.
 2 MR. ADRIAN: Okay. Well, I have no
 3 objection to its being admitted.
 4 MR. HINKLE: That would make it City
 5 Exhibit NN, is that correct?
 6 MR. LANG: (Nodded head up and down.)
 7 HEARING OFFICER POPE: NN?
 8 MR. HINKLE: NN as in Nathan Nathan. I
 9 had to get my son's name in here somehow.
 10 HEARING OFFICER POPE: I don't have any
 11 strong feelings about this. It sounds to me like
 12 it's more illustrative but for purposes of showing
 13 it together with the various facilities, if it is
 14 useful to the parties, I think it might be helpful
 15 to go ahead and mark this and have a copy
 16 introduced. It does not appear that there's
 17 objection to that. So if that's the case, why, it
 18 will be admitted as City Exhibit NN, and if you'll
 19 provide an appropriate copy for the record.
 20 MR. HINKLE: Yes, certainly. Thank you.
 21 Q Mr. Blain, you said that what we're dealing with
 22 here is the issue of commitment to recharge the
 23 aquifer with water that meets all drinking water
 24 regulations and will not degrade the ambient use of
 25 water in the basin storage area. This is the

1 **capture water without negative impacts on the**
 2 **aquifer.**
 3 Q Mr. Blain, there's an additional regulation that
 4 provides more information on performance of a bank
 5 storage well. That is K.A.R. 5-22-17. Could you
 6 please address that regulation.
 7 **A Yes. That definition states that -- and this --**
 8 **that definition is very much quantitatively**
 9 **identified in the operation of bank storage wells.**
 10 **Is says: Each application for one or more bank**
 11 **storage wells shall demonstrate all of the**
 12 **following: One, the hydraulic connection from the**
 13 **stream bed and banks to each bank storage well**
 14 **screen is sufficient to transmit bank storage water**
 15 **from the bed and banks of the stream to each bank**
 16 **storage well screen at a rate sufficient to sustain**
 17 **the authorized rate of diversion of the well or**
 18 **wells; and with -- number two, within seven days**
 19 **after pumping of the bank storage well has ceased,**
 20 **the water levels of each bank storage well or a**
 21 **monitoring well adjacent located within 100 feet o**
 22 **that bank storage well will recover to an elevation**
 23 **equal to or greater than the water level elevation**
 24 **immediately before the bank storage well began to**
 25 **pump, adjusted for any regional groundwater leve**

1 changes not caused by pumping the bank storage well;
 2 and, number three, the naturally occurring and
 3 artificially induced rate of infiltration from the
 4 bed and banks of the stream when bank storage is
 5 occurring will be sufficient to meet the following
 6 conditions: A, equal to or exceed the authorized
 7 rate of diversion of all the bank storage wells; B,
 8 prevent impairment caused by all bank storage wells;
 9 and, C, prevent groundwater mining caused by all
 10 bank storage wells.

11 Also states that if an application for a bank
 12 storage well is approved by the chief engineer the
 13 applicant shall install one or more water level
 14 measurement tubes at locations that will allow
 15 adequate monitoring of groundwater quality and
 16 groundwater levels within the area where the annual
 17 cone of depression of the bank storage well or wells
 18 could be greater than 0.5 feet. Each water level
 19 measurement tube shall be constructed and maintained
 20 in accordance with K.A.R. 5-6-13.

21 In addition to that descriptions, I might
 22 point out that there's also a description in the MOU
 23 with the Groundwater Management District that
 24 requires that the cone of depression from a bank
 25 storage well will not exceed 10 feet at a 660 feet

1 the first year we're required to turn in quarterly
 2 reports -- monthly reports, then quarterly reports,
 3 then annual reports. There will be an extensive
 4 monitoring and analysis and review of every one
 5 of -- the operation of every one of these wells to
 6 make sure they comply with all of the measurable
 7 components in that definition -- in that regulation.

8 Q Mr. Blain, is it correct that these wells can't be
 9 measured or monitored until drilled?

10 A That is correct.

11 Q And they can't be drilled until we get a permit.

12 A All you can do is make assumptions, but you cannot
 13 assure that the well will capture as much water as
 14 the river gives it until you've pumped it under
 15 those kinds of conditions where water is available.

16 Q And you're waiting for approval for that process.

17 A That is correct.

18 Q The next regulation dealt with is safe -- the
 19 definition of safe yield.

20 A Safe yield definition means that the long-term,
 21 sustainable yield of the source of supply, including
 22 hydrologically connected surface water or
 23 groundwater. K.A.R. 5-3-10 says availability of
 24 water for water appropriation, safe yield. Except
 25 as set forth in Subsection B of K.A.R. 5-3-16 and

1 from the well on either side of the river.

2 All of the items addressed establish
 3 measurable performance standards for a bank storage
 4 well. Through the installation of a monitoring
 5 network that is being proposed, and reports on the
 6 data collected from that network, it's possible to
 7 get a very firm grasp on the operation of the
 8 diversion wells to assure they comply with the
 9 parameters identified in the regulations and they
 10 consequently do not prejudicially or unreasonably
 11 affect public interest, which is the topic of issue
 12 number four in the hearing order.

13 The city at this point in time cannot assure
 14 that all the wells requested in these applications
 15 will meet all parameters specified for bank storage
 16 wells because that can only be determined from the
 17 field pump tests. However, it can assure that if
 18 the proposed monitoring well network is installed,
 19 that the city and all other regulatory entities will
 20 be able to measure, control and administer the wells
 21 so that they do comply with all of the established
 22 parameters.

23 The monitoring network is the key component to
 24 making sure this works. We're not asking for a leap
 25 of faith. The MOU, the staff conditions, I believe

1 K.A.R. 5-3-17, the approval of any new application
 2 to appropriate groundwater or surface water for
 3 beneficial use except for domestic use, temporary
 4 use and term permits for five years or less, shall
 5 not cause the safe yield of the source of water
 6 supply to be exceeded, neither shall it otherwise
 7 prejudicially and unreasonably affect public
 8 interest.

9 As stated previously, the city has invested
 10 significantly to document the occurrence of bank
 11 storage and to assure that the operation of the
 12 diversion wells will be done in a way that does not
 13 impact the amount of groundwater available to other
 14 users. The previously displayed hydrograph also
 15 demonstrates the effectiveness of a well-designed
 16 monitoring well system. In the hydrograph the
 17 monitoring wells showed that there was good
 18 connection between the pumping well and the surface
 19 water, and that the pumping well was not impacting
 20 groundwater levels. If there is not a good
 21 connection between the river and the well, the
 22 monitoring well network will not display the
 23 variations in groundwater levels and river stages
 24 and it would indicate that the groundwater levels
 25 declined after the well was pumped.

1 The city believes that the monitoring well
2 network and the recommended operating parameters can
3 assure that the diversion wells will be operated in
4 a manner that complies with the safe yield
5 regulations.

6 Q And the definition of source water.

7 A That definition states that source water means water
8 used for artificial recharge that meets the
9 following conditions: One, is available for
10 appropriation for beneficial use; two, is above base
11 flow stage in the stream; and, three, it's not
12 needed to satisfy minimum desirable stream flow
13 requirements and downstream users. The city's
14 applications, when administered with the recommended
15 conditions, will assure the diversion wells will
16 fully meet the above description of source water.

17 Items two and three of this definition also
18 show the interrelationship of issues four and six
19 established for this hearing. Issue four addresses
20 concerns that the vertical wells only utilize bank
21 storage, while issue six states concerns that the
22 diversion wells don't impede downstream water users.
23 Downstream water users can only be affected if there
24 is a connection between the river and the diversion
25 wells. If the connection between the river and the

1 Q That would be --

2 A Division of Water Resources Exhibit T. Predicts
3 that water levels in the Little Arkansas River at
4 Valley Center will improve under almost all
5 conditions when the full-scale projects are
6 completed.

7 The maroon line, if you will, if you can pick
8 that out, is the 100 million gallon a day system,
9 the blue one is the larger system, and the wider
10 colored lines are the current and the no action
11 alternative. As you can see, under almost all
12 conditions the no action alternative keeps -- stayed
13 worse than the current condition, because if we
14 don't recharge the aquifer, then the aquifer will
15 continue to decline over time. But what is also
16 important to see is almost every month, except for
17 May and June, water levels after the project is in
18 place, are higher than either of the current or the
19 do nothing alternatives. The only months that are
20 less is the high flow months of April and May when
21 we'll be taking that water -- some of that water and
22 putting it back into the aquifer. That's the
23 primary recharge time, but as you can see, those are
24 also -- when we're done the median flow still
25 exceeds 80 CFS. That's what the computer modeling

1 wells is established, then there has to be attention
2 given to the -- establishing the downstream flows
3 and maintaining those. When each well is drilled,
4 the monitoring well network will be used to
5 establish if that -- the connection exists between
6 the river and the well. The monitoring network and
7 the stream flow gage will then be used to assure
8 that the operation of the well does not take more
9 water than the river can supply the aquifer and that
10 the flows in the river are maintained and
11 groundwater levels are maintained. The
12 recommendation from the GMD establish the base flow
13 requirements of the river and also the additional
14 flows that must be present to meet existing surface
15 water rights. If those flows are maintained, then
16 the concerns addressed in issue six are addressed.
17 However, it's also important to look at the impact
18 of the entire project on flows on the river and not
19 just phase one. Because the aquifer discharges into
20 the Little Arkansas River, if groundwater levels are
21 restored, flows in the river will improve, even as
22 we're taking water out of the river, to recharge the
23 aquifer. This next figure, which is figure 4-3 from
24 the environmental impact statement, which is Exhibit
25 T --

1 indicates. And, again, what that demonstrates is
2 that the full scale project, rather than impairing
3 downstream water users, will improve water available
4 to downstream users, and that we can -- with proper
5 monitoring, will assure that we don't take more
6 water than we're supposed to when the flow events
7 aren't available. The controlling of the
8 interaction of the river flows and the groundwater
9 elevations will be a balancing act, but one that can
10 be accomplished with the use of the monitoring and
11 reporting tools that are provided in the
12 applications and GMD's recommendations.

13 Q And what's the relationship between the definition
14 of source water and any potential degradation of the
15 ambient groundwater quality of the basin storage
16 area?

17 A Item four of the source water definition states that
18 the sources will not degrade the ambient groundwater
19 quality in the basin storage area. Because of the
20 index well network we've already established and the
21 water quality information gathered from that --
22 those index wells and the test wells at the
23 diversion sites, the city is able to provide a good
24 profile of the existing water quality.

25 A little later you'll hear some additional

1 testimony on water quality from Andy Ziegler with
2 the USGS, but at this point I want to assure you
3 that the city will not recharge any water that does
4 not meet drinking water standards established by EPA
5 and no users will have to treat their water to meet
6 those standards because of this project.

7 I can also state that the recharge of the
8 aquifer with water obtained from the diversion wells
9 will be a dramatic improvement from the water
10 quality that will occur if nothing is done to
11 address the chloride contamination plumes.

12 Q One of the earlier regulations you've addressed
13 referenced 5-12-2. That's the aquifer storage and
14 recovery accounting. Could you address how the
15 city's demonstration project and now its application
16 will meet the requirements of that regulation.

17 A Yes. 5-12-2 states that aquifer storage and
18 recovery accounting, part A: In addition to the
19 annual water use reporting requirements pursuant to
20 K.S.A. 82a-732 and amendments thereto, on June 1st
21 of each year permit holder of an aquifer storage or
22 recovery system shall report an accounting of water
23 in the basin storage area to the chief engineer and
24 to any groundwater management district identified in
25 Subsection C of this regulation. The annual report

1 located in each cell.

2 The annual accounting shall specifically take
3 into account the amounts of natural recharge,
4 artificial recharge, groundwater inflow, groundwater
5 outflow, evapotranspiration and groundwater pumpage.
6 Groundwater pumpage shall include recharge credits
7 withdrawn as well as pumpage from all nondomestic
8 wells in the basin storage area. The annual
9 accounting shall include any additional items within
10 the basin storage area that would be necessary to
11 determine the amount of recharge credit available
12 for recovery.

13 You'll hear more about the specifics of the
14 model that is recommended to assist in the
15 performing of the necessary accounting for this
16 project from Dave Stous, but, again, I want to
17 reiterate that that model does comply with every
18 component identified in this regulation.

19 Q Mr. Blain, will you discuss issue number seven
20 identified by the chief engineer which questions if
21 the proposed project will impair water rights senior
22 to the date these applications were filed and if the
23 project will adversely affect the public interest.

24 A Within the definition of basin storage area that the
25 city has identified, the portion of the aquifer that

1 of the preceding calendar year shall be -- shall
2 account for all water entering and leaving the basin
3 storage area and shall specifically compute the
4 amount of recharge credits held in basin storage
5 area. It goes on to identify A -- or part B, that
6 the report shall be in a form prescribed by the
7 chief engineer and shall address items in the water
8 balance of the basin storage area, which may include
9 the following amounts: Number one, natural and
10 artificial recharge. And I'll insert that the model
11 we're going to use does account for that. Number
12 two, groundwater inflow and outflow. Our model
13 accounts for that. Number three, evaporation and
14 transpiration. Our model accounts for that. Number
15 four, groundwater diversion from all nondomestic
16 wells. We will be gathering that information from
17 the GMD and other sources, so that is included in
18 the accounting system. Infiltration from streams.
19 That is a component of the model. Number six,
20 groundwater discharge to streams. That's a
21 component of our model. Number seven, calculated
22 recharge credits and other information that the --
23 in the opinion of the chief engineer are pertinent
24 to the basin. And the model will provide calculated
25 recharge credits for each of the recharge wells

1 was -- we've identified within the basis for our
2 hearing the portion of the aquifer we're going to
3 store water. By that definition, the city cannot
4 use water if water levels are below the levels
5 reached in January of 1993. If there were no
6 impairments claimed at that time, then using only
7 that portion of the aquifer above that level would
8 assure that no senior water rights are impaired,
9 because the project would seek to keep water levels
10 above the 1993 level. Rather than being impaired,
11 senior water rights will be enhanced because water
12 levels would be higher than what they would if the
13 project was not done. Rather than the 1993 levels,
14 if the city had not already taken steps to use water
15 from Cheney Reservoir, the water levels would have
16 gone below the 1993 level if the city had not
17 changed its water use pattern. Conversely, if this
18 project is not done and no artificial means of
19 recharging the aquifer is implemented, then water
20 levels will continue to decline again causing
21 impairment. That impairment, whether from water
22 levels or water quality impairment caused by
23 chloride contamination will require water rights
24 senior to this project but junior to other rights
25 held by the city to possibly be curtailed in order

1 to protect the water -- the existing -- more senior
2 water rights. Therefore, rather than adversely
3 affecting public interest this project is very
4 beneficial to the public interest.

5 Q The issued number eight on the pretrial --
6 prehearing order addresses whether changes the city
7 has requested -- addresses certain changes that the
8 city has requested for its applications. How have
9 the concerns included in that issue been addressed?

10 A The GMD has reviewed each of the changes and the new
11 application. They've made recommendations to the
12 chief engineer which were distributed this morning
13 that include monitoring and operating conditions
14 that will assure that these changes do not
15 unreasonably affect the public interest. As with
16 the other applications, it is appropriate to have
17 concerns identified in issue number eight, but the
18 solution to those concerns is establishing a
19 monitoring program that can scrutinize the operation
20 of the facilities, and assure that no senior water
21 rights are impaired, and that the public interest is
22 not affected. The MOU and the controls included in
23 the staff recommendations are the appropriate tools
24 to assure that the facilities do not have negative
25 impacts. As with other components of the project,

1 in the process of implementing the recommendations
2 of the plan. The hydrobiological monitoring plan
3 will help assure that any negative impacts are
4 discovered and that appropriate modifications are
5 made to the -- to the local water supply plan to
6 assure that it remains in the public interest.

7 MR. HINKLE: Thank you, Mr. Blain. No
8 further questions.

9 HEARING OFFICER POPE: Okay. Thank you
10 very much. I see that it's about 12:15 or 20.

11 Mr. Adrian, I assume you would have some questions
12 for the witness, and I'm wondering whether we should
13 hold those until after lunch.

14 MR. ADRIAN: That will be fine.

15 HEARING OFFICER POPE: I think perhaps
16 maybe that might be the most practical thing. It's,
17 like I say, about 12:20. Let's recess, and is an
18 hour sufficient for lunch, or is more time needed
19 than that? I'm not sure of the local conditions or
20 if there's other things that people need to do and
21 make preparation. Want to reconvene at 1:30?

22 MR. ADRIAN: That would be fine.

23 HEARING OFFICER POPE: We'll reconvene
24 until 1:30. We'll stand recessed until that time.
25 Thank you very much.

1 if operated as specified, these changes will have
2 positive impacts on senior water rights and will not
3 have negative impacts on public interest.

4 Q What other steps has the city taken to assure that
5 this project will not prejudicially and unreasonably
6 affect the public interest?

7 A I previously mentioned the city did an environmental
8 impact statement, which was DWR Exhibit T. That's
9 been completed. The city was not under any
10 obligation to do the EIS but did it as part of its
11 continuing effort to make the project as transparent
12 as possible and assure that the project was done in
13 the public's interest. And this -- the EIS was
14 reviewed by all the agencies that normally review an
15 EIS, and it demonstrated that there were no negative
16 impacts anticipated by the completion of the city's
17 integrated local water supply plan. More
18 importantly, it found that doing nothing on the
19 project had far more disastrous impacts on the
20 public good. The EIS also recommended that the city
21 prepare and implement a hydrobiological monitoring
22 plan in order to monitor for the impacts, whether
23 positive or negative, associated with the integrated
24 local water supply plan. That hydrobiological
25 monitoring plan has been completed, and the city is

1 (There was a recess from 12:19 p.m.
2 to 1:41 p.m.)

3 HEARING OFFICER POPE: Hearing is back in
4 order. I will now turn to Mr. Adrian for
5 cross-examination of the witness.

6 CROSS-EXAMINATION

7 BY MR. ADRIAN:

8 Q Thank you. I was going to try to refer to you as
9 Mr. Blain. It doesn't come naturally to me, Jerry.
10 I've asked you to put up on the screen what you have
11 identified or has been identified as City's Exhibit
12 NN, which I think is an arsenic -- what I would
13 describe an arsenic contour map, something similar
14 to that, and at the top of that map I think as you
15 correctly pointed out or as you pointed out is a
16 white area, and what does that signify?

17 A The area that does not have -- that little pocket up
18 there would be sites where we had measured arsenic
19 or arsenic had been measured in the zero to five
20 parts per billion.

21 Q So that is the lowest arsenic level really within
22 that -- the area that map covers.

23 A Correct.

24 Q And there are two -- at least two recharge wells in
25 that area, aren't there?

1 **A Correct.**
 2 **Q** In anticipating questions that might be conjured up
 3 by the public and otherwise, I would say if you're
 4 putting water -- gathering water from areas let's
 5 say within the red that have a high arsenic level or
 6 higher than is in the white area, and injecting it
 7 in the white area, aren't you lowering the quality
 8 of that water?
 9 **A** What is -- we will -- are doing and what we will --
 10 required to do is make sure that that water all
 11 meets the drinking water standard. Now, whether
 12 there is really any difference once you reload the
 13 drinking water standard, how far below the drinking
 14 water standard you are is a pretty irrelevant
 15 question. What is relevant is whether or not it
 16 does -- is below the standard, and whether we're
 17 speaking of arsenic or any of the other 200 plus
 18 constituents that could be in water that are
 19 controlled to the drinking water standards act.
 20 **Q** So when you say there are 200 other constituents,
 21 that it's a -- quality is a composite of all of
 22 those I assume is what you're saying.
 23 **A** Well, not exactly, because there are 200 plus
 24 constituents, but each constituent has its own
 25 standard. Generally speaking, when they set the

1 drinking water standard, it's based on a risk of
 2 approximately one in 10,000 after 70 years of usage.
 3 Bear in mind, I think your chance of being hit by
 4 lightning is like one in 9,000, so -- but each
 5 constituent has that rating, so if you have a glass
 6 with 70 constituents, each constituent in that glass
 7 is rated to a one in 10,000 risk, not the 70 in
 8 aggregate as one in 10,000.
 9 **Q** Well, then, if you look at the commitment that was
 10 made under the memorandum of understanding under
 11 issue eight where -- and I recited this earlier,
 12 where you agree not to inject water that is of
 13 lesser quality, I'm paraphrasing, than drinking
 14 water standards and will not degrade the ambient use
 15 of the water in the basin storage area, is -- have
 16 you agreed to something you can't do there?
 17 **A** No, not by any means. The ambient use within this
 18 area, if you go -- and I don't have the chloride
 19 contamination plume up there, for instance. The use
 20 of that water two miles to the east is not for
 21 drinking water quality. So the ambient use in that
 22 area is not drinking water. The ambient use, at
 23 least in the area we're doing it, the highest best
 24 ambient use is drinking water quality water. And so
 25 if we can reach that standard -- if we were

1 recharging where the water standards didn't meet
 2 ambient use for drinking water, you know, that would
 3 be a worse standard. And there are some areas of
 4 the equus beds where the water really isn't at all
 5 drinkable water quality, so the ambient use of that
 6 area might not be drinking water, it might be
 7 cooling water, it might be mineralization control
 8 or, you know, things like that. So the ambient use,
 9 you still go with what the highest ambient use is.
 10 In this case, the ambient use in this area of our
 11 recharge is drinking water.
 12 **Q** On another subject, when you began your testimony
 13 and you were talking about the demonstration project
 14 near Halstead, and the phraseology you used caught
 15 my eye -- caught my ear was that you were
 16 withdrawing water that was replaced by -- you were
 17 withdrawing aquifer water replaced by bank storage
 18 water. Is that going to be characteristic of the
 19 project in general? In other words, is it -- are
 20 you actually withdrawing bank storage water or are
 21 you withdrawing aquifer water that's replaced by
 22 bank storage water?
 23 **A** Well, within the definition I've described, that's
 24 the regulations 5-22, I think it is, it defines the
 25 bank storage, and when you're pumping water out of a

1 well, it is not molecule for molecule river water,
 2 but what you are doing is assuring that whatever
 3 water you pumped is, if you will, restored,
 4 replaced, replenished with a source that compensates
 5 entirely for the amount of water that you're
 6 pumping.
 7 **Q** So it would be fair to say there's no bright line
 8 between the two, obviously.
 9 **A** No, it's not -- it's clear-cut probably when it
 10 doesn't happen, because when it's -- when you're
 11 taking more water than bank storage makes available,
 12 then you would observe a deterioration in water
 13 levels and see that you're not responding to the
 14 measurable parameters that are defined.
 15 **Q** The next question I would have is that talking about
 16 the raising of the water level to -- and I believe
 17 it was -- we're using the 1940 standard?
 18 **A** Correct.
 19 **Q** In other words, that will be the maximum?
 20 **A** (Nodded head up and down.)
 21 **Q** You know, I was about to ask you whether you agree
 22 with Mr. Warren's conclusion in that regard, then I
 23 thought, silly me, of course you agree with him,
 24 don't you? But in regard to that not being a
 25 problem, in other words, you don't see that as a

- 1 problem, in raising the water level or water table.
- 2 **A We do not see that as an unreasonable raising of the**
- 3 **water table, and I think Mr. Warren alluded to, you**
- 4 **know, if there are negative -- if there's actually**
- 5 **somebody that's negatively impacted by that that**
- 6 **could be addressed, but in terms of management of**
- 7 **the aquifer, that raising the water to this**
- 8 **historical levels is not a unreasonable raising.**
- 9 Q You have served on the board of the district for how
- 10 many years?
- 11 **A I think I started in '92.**
- 12 Q It would be about 12 years.
- 13 **A 12 years.**
- 14 Q And so you were on the board when these applications
- 15 were conceived and then eventually filed?
- 16 **A Yes.**
- 17 Q And so you actually prepared them, probably, at
- 18 least in whole or in part yourself?
- 19 **A (Nodded head up and down.)**
- 20 Q So you're very familiar with the applications.
- 21 **A Yes.**
- 22 Q And this -- I would assume that you're also
- 23 extremely familiar with the recommendations that the
- 24 district made to the chief engineer?
- 25 **A Familiar with them, yes.**

- 1 Q Along with the recommendations and report from Carl
- 2 Nuzman, you're familiar with that?
- 3 **A Yes.**
- 4 Q Probably read it? And the Memorandum of
- 5 Understanding, I don't know whether you were present
- 6 when that was agreed to, but you are familiar with
- 7 that too?
- 8 **A Yes.**
- 9 Q And its attachment A and then the discussion or
- 10 recommendation of the board, you're familiar with
- 11 that?
- 12 **A Uh-huh.**
- 13 Q Now, then, in effect, is it the position of the city
- 14 that you are asking approval of these applications
- 15 by the chief engineer as modified by all of those
- 16 documents?
- 17 **A Yes. All the conditions and controls and**
- 18 **administrative requirements of the MOU and the staff**
- 19 **recommendations, the city is willing to go with**
- 20 **those. I mean, for instance, as I read here this**
- 21 **morning, the regulations require an annual report to**
- 22 **the Division of Water Resources. The MOU requires**
- 23 **for the first year monthly reports, the second year**
- 24 **quarterly reports. It's not until the third year of**
- 25 **operation. So those are additional conditions, the**

- 1 **monitoring wells and everything else, are additional**
- 2 **controls that we support as part of doing this**
- 3 **project with the Groundwater Management District.**
- 4 Q And to the extent of your knowledge and authority
- 5 within the city and in regard to these applications
- 6 are you satisfied with the process that the
- 7 Groundwater Management District went through in
- 8 considering and recommending these applications to
- 9 the chief engineer?
- 10 **A Yes. I mean, I did not participate in the --**
- 11 **forming the MOU, I wasn't at those meetings, but I**
- 12 **believe the district staff or the consultant, board**
- 13 **members present and staff in representing the city**
- 14 **of Wichita worked very hard to find places where the**
- 15 **controls could be instituted that would address the**
- 16 **major issues that were expressed by members of the**
- 17 **board and public.**
- 18 Q Now, and I am referring more to procedural than I am
- 19 substantive consideration, you're satisfied that the
- 20 procedure was followed?
- 21 **A Yes, I believe there was -- we had a public hearing**
- 22 **to review the applications. The board had meetings**
- 23 **before and after that, so I do believe that due**
- 24 **diligence was followed by the board in reviewing the**
- 25 **applications.**

- 1 Q Thank you.
- 2 **REDIRECT EXAMINATION**
- 3 **BY MR. HINKLE:**
- 4 Q Mr. Blain, the map that's still up on the projector
- 5 is the one showing arsenic concentration, is that
- 6 correct?
- 7 **A Correct.**
- 8 Q And there are, in the area of lowest arsenic
- 9 concentration, two of the recharge wells, is that
- 10 also correct?
- 11 **A Correct.**
- 12 Q And if I understand your -- the proposal accurately,
- 13 the intent is to pump water from outside that area
- 14 into that area which would have the effect of
- 15 raising, in the absolute, the arsenic level,
- 16 although still leaving it at a level below any
- 17 danger level indicated by the primary water --
- 18 drinking water standard, is that right?
- 19 **A Correct.**
- 20 Q Now, those two wells are there because -- the
- 21 recharge wells are proposed to be there because of
- 22 the imminence of saline or chloride contamination,
- 23 is that right?
- 24 **A That's correct, too.**
- 25 Q And you've been asked if the water quality standard

1 is -- comprise a whole number of contaminants, and
 2 two of those contaminants are arsenic and chloride,
 3 is that right?
 4 **A Correct.**
 5 **Q** If those recharge wells are not placed in that area
 6 of low arsenic concentration, the low arsenic
 7 concentration soon becomes meaningless, doesn't it?
 8 **A Yes, because it would not meet the drinking water**
 9 **standards because of chloride contamination.**
 10 **Q** If you do nothing, if you don't put those wells
 11 there, then irrespective of the low arsenic level,
 12 the water comes useless because of the chloride
 13 infiltration.
 14 **A That's correct.**
 15 MR. HINKLE: Thank you.
 16 HEARING OFFICER POPE: Mr. Rolfs, do you
 17 have questions?
 18 MR. ROLFS: Yes.
 19 EXAMINATION
 20 BY MR. ROLFS:
 21 **Q** Mr. Blain, going back to your testimony about the
 22 ownership issues of acquiring the well sites, I
 23 haven't had a chance to review the updated part that
 24 you sent in, but I understand from your testimony
 25 that you have acquired contracts with all but three

1 **this project would impact the perched water.**
 2 **Q** Right. I understand.
 3 **A And so by my assumption there may be some -- some**
 4 **saturated zone there, but there's also a significant**
 5 **unsaturated zone between the geologic area forming**
 6 **the perched water table and the area of the aquifer**
 7 **that we will be recharging into.**
 8 **Q** So you're saying there is an unsaturated zone that
 9 separates the perched water table from the --
 10 **A Correct, yes.**
 11 **Q** Okay. That was my understanding of what a perched
 12 water table was --
 13 **A Yes.**
 14 **Q** -- anyway, but -- and so it's your contention
 15 basically that by recharging into the lower zone and
 16 bringing the water table up, in that zone you're not
 17 going to be increasing the one in the upper zone,
 18 you're going to be equalizing them, if nothing else.
 19 **A That would be --**
 20 **Q** Or reducing the difference.
 21 **A Reducing the difference, probably. I doubt that**
 22 **they would merge, if you will.**
 23 **Q** Okay. But it would not produce the effect of
 24 raising the perched water table.
 25 **A Correct.**

1 of the owners, is that correct?
 2 **A I believe there are, as of -- since lunch time, only**
 3 **two that we don't have the actual contracts back.**
 4 **Q** Okay. And do you have a timetable for acquiring the
 5 other two, an estimated timetable for acquiring the
 6 other two contracts?
 7 **A I would anticipate that we could come to completion**
 8 **on both of those contracts within a matter of a**
 9 **couple weeks. We are in negotiations, you know, if**
 10 **you will, dotting the Is and crossing the Ts.**
 11 MR. ROLFS: Okay. Thank you. I have no
 12 further questions.
 13 HEARING OFFICER POPE: Mr. Bagley.
 14 EXAMINATION
 15 BY MR. BAGLEY:
 16 **Q** I just had one question, and it related to I believe
 17 the exhibit you still have on the -- on the easle up
 18 here, talking about perched water table. Is the
 19 definition of perched water table you're using
 20 simply that the water level in the upper aquifer is
 21 at a higher level than it is in the lower aquifer,
 22 or is there an unsaturated zone that exists between
 23 the two?
 24 **A For the purposes I was talking about perched water**
 25 **was relative to whether or not the activities of**

1 MR. BAGLEY: Okay. That's it.
 2 EXAMINATION
 3 BY HEARING OFFICER POPE:
 4 **Q** Mr. Blain, I only have a couple of questions here.
 5 Is it my understanding, based on your testimony,
 6 that all of the data collection measurement sites
 7 for water levels and quality, I guess, that are set
 8 forth in the -- in the proposal, which I take it to
 9 include those in the GMD recommendation and MOU,
 10 that the city is fully committed to operating those
 11 and maintaining those and collecting that data and
 12 making it available based on that proposal? Is that
 13 a --
 14 **A Yes. We are in support of the monitoring well**
 15 **network that -- in both the quantity and quality**
 16 **established both for the diversion wells, which**
 17 **there's somewhere in the neighborhood of six, I**
 18 **think, at least, and then also for each of the**
 19 **recharge wells which vary from four to six, at those**
 20 **sites, so, yes, that -- we are supportive of**
 21 **installing that network and putting in appropriate**
 22 **monitors and appropriate testing at each of those**
 23 **sites.**
 24 **Q** Okay. Thank you. Earlier in your testimony you
 25 showed a slide -- we don't need to have it again,

1 before us, and it may have been over here someplace,
 2 but it was the one that showed the hydrograph and
 3 water levels for 1998. Is that a representative
 4 picture, if you will, of the various conditions --
 5 and that took care of a several month recharging
 6 event, if I may call it that. Have you examined
 7 that same kind of data sufficiently to say whether
 8 that is sort of representative of other hydrologic
 9 events and recharge events?
 10 **A Yes. Within the demonstration project, we had this**
 11 **extremely significant monitoring network set up at**
 12 **the diversion well site, but we also had I believe**
 13 **four other sites along the river and we put in**
 14 **strings of monitoring wells to observe if bank**
 15 **storage events occurred along the entire reach of**
 16 **the river that we were interested in, and each of**
 17 **the sites demonstrated impacts on water --**
 18 **groundwater elevations as river elevations change,**
 19 **and in fact one of the equus beds monitoring wells**
 20 **just north of the proposed diversion wells -- I**
 21 **don't know if Mike Dealy will be showing this, but**
 22 **he has historical water level graphs on it,**
 23 **hydrographs, that demonstrated that well also**
 24 **changing elevations with changes in flow in the**
 25 **river. So we believe that bank storage condition,**

1 if you will, is a common occurrence along the river.
 2 The balance will be to assure that the amount of
 3 water we withdraw matches how much bank storage is
 4 occurring.
 5 **Q** And do you expect that there will be some
 6 variability up and down along the river for
 7 different sites, or is that --
 8 **A Yes. Now, as a for instance, the wells we**
 9 **drilled -- test wells, we've made some preliminary**
 10 **estimates that they'll range from say 600 gallons**
 11 **per minute to 1,200 gallons per minute of capacity**
 12 **based on the geology we observed. Now let's say we**
 13 **round it up to 1,000 gallons per minute is what we**
 14 **think that well will produce. We can put the well**
 15 **in there, we can pump 1,000 a minute, but with the**
 16 **monitoring network, we would then be able to**
 17 **determine if, when we're pumping 1,000 gallons per**
 18 **minute, is the connection with the river adequate to**
 19 **support that 1,000 gallons per minute or will we**
 20 **perhaps have to reduce pumpage from that well to**
 21 **800 gallons per minute in order to reach that**
 22 **balance. And so it's not a case necessarily of**
 23 **whether or not the bank storage is occurring at that**
 24 **site, but also, if it's occurring, we are pumping at**
 25 **a rate that supports that recharge capacity from the**

1 river. And that will have to be determined at each
 2 site. And, again, I believe the controls that are
 3 in place that will allow us to reach that
 4 equilibrium. We may have some sites where we're now
 5 limited to 1,000 gallons per minute where the
 6 capacity might be 1,200 or 1,500 gallons per minute,
 7 so there will be more capacity. There will probably
 8 be -- there may be other sites where we've
 9 overestimated the capacity and we'll actually pump
 10 less than we had hoped to because that
 11 interconnection wasn't as big as we thought, but
 12 it's reasonable, based on our data, to believe that
 13 interconnection does exist to one degree or another
 14 at each of these sites.
 15 HEARING OFFICER POPE: I don't believe I
 16 have any further questions. Are there -- has that
 17 generated any other questions from counsel?
 18 MR. ADRIAN: I have none.
 19 MR. HINKLE: I have none.
 20 HEARING OFFICER POPE: Thank you,
 21 Mr. Blain. You may call your next witness.
 22 MR. HINKLE: City would call Andrew
 23 Ziegler to the stand.
 24 ANDREW C. ZIEGLER,
 25 called as a witness, having been first duly

1 sworn, testified as follows:
 2 DIRECT EXAMINATION
 3 BY MR. HINKLE:
 4 **Q** Mr. Ziegler, would you please state your full name
 5 once you get situated there and give your
 6 educational background and your current duties with
 7 your current employer.
 8 **A My name is Andrew C. Ziegler. I'm an employee of**
 9 **the United States Geological Survey.**
 10 **Q** Can we take a test a minute?
 11 **A Yeah.**
 12 **Q** Is that -- okay.
 13 **A Try it again?**
 14 **Q** Go ahead.
 15 **A Okay. I'm sorry. Repeat the question.**
 16 **Q** We were at your name.
 17 **A Who am I?**
 18 **Q** Yes.
 19 **A Okay. I'm Andrew C. Ziegler. I'm an employee of**
 20 **the United States Geological Survey. I'm a**
 21 **supervisory hydrologist, water quality specialist,**
 22 **and the project chief for the equus beds recharge**
 23 **project since about 1995.**
 24 **Q** What briefly what are your educational
 25 qualifications for that position?

1 A I have an undergraduate degree in geology and a
2 master's of science degree in urban environmental
3 geology, which I received from -- both degrees from
4 University of Missouri at Kansas City.

5 Q Would it be accurate to say that the USGS presence
6 on this project relates to providing of historical
7 data and doing interpretive studies relating to
8 that?

9 A Yes, it would.

10 Q Mr. Pope, this is the witness I was thinking of
11 particularly this morning when I suggested that the
12 most fluid presentation would just be a presentation
13 off of the Power Point without intervening
14 questions, and if that's all right, we could proceed
15 that way.

16 HEARING OFFICER POPE: Why don't you
17 proceed that way. If it becomes a problem, I will
18 deal with it.

19 MR. HINKLE: Great.

20 A And if I might, if I get too long winded on
21 something, I'm sure you'll stop me.

22 HEARING OFFICER POPE: I'll try.

23 A This might help. That's a CD of the presentation
24 and a couple of copies. I believe all counsel has a
25 copy also. Yeah. Next slide.

1 This is a summary of the questions I just
2 responded to. I think one thing I would emphasize
3 is my background is in geochemistry and also looking
4 at agricultural chemicals in surface water and
5 groundwater.

6 The reason I'm testifying here today is I'd
7 say that there's probably few folks around that have
8 more intimate knowledge of the water quality in the
9 equus beds right now than probably I do with all of
10 samples we've collected.

11 Why USGS is involved. The purpose of this
12 slide is to describe -- United States Geological
13 Survey as part of our mission is to describe the
14 water resources in the nation. We enter into
15 cooperative agreements with federal, state and local
16 agencies to do that type of work, and in particular
17 this is an example, this study of the equus beds
18 aquifer area with the city of Wichita is an example
19 of one of those studies. What USGS gains out of
20 this is knowledge of chemistry and the water
21 resources throughout the United States that we can
22 put together with other studies done in other states
23 to really try to provide a good picture of the water
24 quality and water resources to Congress.

25 The funding associated with the demonstration

1 project from '95 to 2000 was rather substantial. It
2 was a total of 3.8 million, with USGS contributing
3 1.4 million of those total study funds, the
4 remainder coming from the city of Wichita. Since
5 then, from 2000 to this year, 2004, we've expended
6 roughly \$4.4 million, with USGS contributing
7 1.3 million.

8 The vast majority of that work is associated
9 with the roles described on this slide of looking at
10 and gathering the water quantity and water quality
11 information associated with the equus beds
12 demonstration project and since then the index well
13 network and to additionally serve as a technical
14 resource not just for the city but for the state and
15 also the federal government.

16 This is a listing of all the citations. You
17 received all of these exhibits, and in essence what
18 I tried to do for the remainder of the slides is
19 electronic screen captures, and so all of this
20 information is in the exhibits that I believe you
21 received under these different exhibit numbers with
22 the city of Wichita. I will attempt to remember to
23 say which exhibit each slide is coming from to try
24 to stay on point with that.

25 Next slide. What I tried to anticipate or

1 provide is testimony relative to some of the chief
2 engineer's questions on -- I'm going to try to take
3 it hopefully logically through from background
4 groundwater information and chloride contamination
5 movement, then move on to water level and storage
6 changes in the equus beds area, then talk about the
7 demonstration project and water quality and some
8 quantity issues associated with that, and then end
9 with the index well network of what we are --
10 currently is the focus of our activities.

11 Next slide. This is just to kind of get us
12 situated in space. The Cheney Reservoir, the city
13 of Wichita, and then this bluish area is the well
14 field area, and the gray outline area in essence
15 forms what I believe is referred to now as the
16 accounting area for the index well network that was
17 developed by GMD2 and others. This is Exhibit --
18 let's see. This is captured out of Exhibit H, City
19 Exhibit H.

20 Next slide. One of the pertinent issues I
21 think to form the foundation for looking at the
22 chloride sources or some of the sources of chloride
23 contamination in the equus beds area were contained
24 in a report done in cooperation with the Kansas
25 Water Office, Groundwater Management District 2,

1 and -- I can't remember who else was cooperating --
 2 oh, U.S. Bureau of Reclamation back in the mid '90s
 3 looking at chloride sources in the equus beds
 4 aquifer. Even then the Groundwater Management
 5 District recognized that there were some potential
 6 issues with salt water and chloride contamination in
 7 the area. These are the sources that were described
 8 in that report coming from the Arkansas River,
 9 naturally occurring from the upwelling from the
 10 Wellington formation, oil field activities and other
 11 associated mining activities and sewage treatment
 12 facilities in the area.

13 I present this table once again from the same
 14 exhibit, City Exhibit H, to demonstrate that there
 15 are large chloride concentrations in the Arkansas
 16 River that was demonstrated from samples collected
 17 back in the late 1980s to the early 1990s that were
 18 in that report averaging around 600 milligrams per
 19 liter as a mean concentration. So it is a rather
 20 substantial source of chloride that, as I'll show a
 21 little later, when the Arkansas River loses water to
 22 the groundwater system in the vicinity of the equus
 23 beds, that high chloride water much in excess of the
 24 secondary drinking water standard at 250 milligrams
 25 per liter can infiltrate and contaminate the

1 aquifer.

2 Unfortunately, this is as good a quality as I
 3 could get. This was the existing chloride contours
 4 done by Nathan Meyers in '89 and '90. It's an
 5 aggregation -- aggregation of a number of data
 6 collection points that they collected, and in
 7 essence the contours during that time period show a
 8 line here that roughly approximates 100 milligrams
 9 per liter. So this was 14 years ago. And this is
 10 in the upper zone and I believe the lower zone.
 11 Next slide. Or middle zone.

12 One of the objectives of that study was to
 13 project how far chloride might move and how much
 14 time it would take for that chloride to migrate into
 15 the equus beds well field area and impair some of
 16 those existing uses within that area for drinking
 17 water, and you have this darker colored blue area.
 18 This is done through a MODFLOW package with particle
 19 tracking setup which Dave Stous will probably get
 20 into some of that later testimony on how all of the
 21 ins and outs of that modeling works, but the main
 22 thing I wanted to kind of illustrate with this slide
 23 was how the progression out to 2019, you can expect
 24 to see this very thin line starts to approach and
 25 get into the idealized well field area here. That

1 blue line approximates the extent of the
 2 100 milligrams per liter chloride concentration for
 3 the study area. So that's not over the drinking
 4 water standard, but it does show that this is going
 5 to -- it simulates that this chloride concentrations
 6 will move and infiltrate into the equus beds if
 7 there is no change in pumping. This was using 1989,
 8 1990 pumpage. So I guess you could look at that as
 9 a best case scenario or no change scenario.

10 Next slide. Well, the historical water use
 11 presented on this slide -- I think I'm going to
 12 focus mostly on this upper slide and we'll get to
 13 this lower slide through some other exhibits.
 14 Looking at the historical water use throughout the
 15 equus beds you can see that that is increased with
 16 time starting back in 1940. That's what this line
 17 is. Showing the increase. This line shows the
 18 city's portion of the water use from -- withdrawn
 19 from the equus beds, and you'll see an inflection
 20 point here about 1993, I believe, where the city
 21 started to change some of their practices to --
 22 actually 1993 through '97, and you see a decline in
 23 the pumpage and water withdrawn from the equus beds
 24 for city use. This line here that kind of jumps
 25 back and forth is groundwater -- estimated

1 groundwater pumpage for irrigation, and this dot is
 2 the permitted irrigation water use throughout the
 3 equus beds. The reason I show this is since 1997
 4 the city's withdrawals have decreased about
 5 50 percent. Agricultural withdrawals are also less
 6 than the permitted amounts. And I can't conclude
 7 anything from that, but you maybe can.

8 Next slide. Water levels in 1940. This is
 9 the baseline that's used for all of the projections
 10 that you've heard discussed. In essence, I think
 11 the main thing -- the main thing I want to show here
 12 is under that predevelopment condition the
 13 groundwater more or less flowed parallel to the
 14 Arkansas River, which it is right here, and the
 15 Little Arkansas River received part of that, which
 16 is right here.

17 Next slide. The historical low from the
 18 measurements that we've got in October -- occurred
 19 in October of 1992, and you see some rather
 20 substantial differences. It's still generally
 21 parallel over here directly south of Burrton,
 22 however, once you get a little bit to the east you
 23 see the combined effects of pumpage throughout this
 24 entire area for agricultural, city and domestic uses
 25 has changed the flow paths to where it's now moving

1 toward those decline areas, and no longer do you
2 really get the same amount of groundwater discharge
3 to the stream. The flow directions have changed, in
4 fact, to where the flow is away from the Little
5 Arkansas River in this vicinity towards the equus
6 beds aquifer area.

7 Next. And I -- this is a little bit different
8 than what's in your exhibits. What I did is I
9 assumed it would be a little hard to see. This
10 outlines the area of more than 20 feet of water
11 level decline relative to those 1940 baseline
12 levels. This red blob is to represent the Burrton
13 chloride contamination area that Jerry I believe
14 showed a map of and I'm sure Mike Dealy will present
15 some information later on that, and then the
16 Arkansas River is a source. And the whole purpose
17 of this slide to demonstrate why it's moving.
18 You've created a hole in this area to where the
19 gradient steepened and therefore the velocity of the
20 groundwater from some of these source areas of the
21 chloride has increased and it's now infiltrating
22 into these areas that previously would have been at
23 a much higher water level, therefore, the gradient
24 wouldn't have existed. I think the other thing
25 that's significant to point out is between -- in the

1 52 year period to the historic low, aquifer storage
2 has decreased by 283,000 acre feet.

3 Next slide. One of the things that has
4 occurred since '92 is these -- as well as having a
5 little bit better precipitation, the city of Wichita
6 changed their withdrawal practices, as I talked
7 about earlier, and also because there was increased
8 precipitation, it decreased the needs for
9 agricultural pumping, and I think the important
10 thing to gain from this slide is that the aquifer
11 can recover, and it can recover quite substantially
12 if stresses are removed or if you have more natural
13 recharge occur in the system. And that's pretty
14 substantial that it's recovered 124,000 acre feet in
15 that 11 year period. However, still, since 1940,
16 through 2003, the storage volume is still decreased
17 by 159,000 acre feet.

18 This is just a table for your -- with specific
19 dates for you to look at if you -- if it spawns some
20 questions, I'd be more than happy to answer any of
21 them, but this is the data table that also contains
22 some of those numbers that I had as bullets on the
23 previous slide.

24 HEARING OFFICER POPE: Mr. Ziegler, do
25 you have the exhibit number for these -- I'm sure we

1 can look it up -- but several of these slides are
2 from --

3 A I apologize. It's City Exhibit E. All of the ones
4 that were referred to as water resources
5 investigation report 03-4298 are City Exhibit E,
6 which is I guess what I've been talking about
7 through the whole period there.

8 Next slide. Okay. Now I move on to
9 discussing the demonstration project and then also
10 the more recent index well network work that we've
11 done. Most of the information that I'll be
12 discussing is contained in City Exhibit F, which is
13 the 1999 baseline water quality report. I will
14 attempt to go through and discuss the quantity
15 related issues. Some of the very similar charts
16 that you've seen on groundwater surface water
17 interaction at some -- at the Halstead diversion
18 site, describe the surface water quality and
19 groundwater quality throughout the area as it
20 related to the demonstration project, and then
21 further go on to the index well network.

22 This is to try to locate you generally.
23 Here's the Little Arkansas River. Here's the big
24 river. Here's the well field outline boundary, the
25 community of Halstead, and the Halstead diversion

1 site, some domestic wells within a few mile radius
2 of the diversion site. The Highway 50 stream gage
3 that was used for term permit withdrawals. Moving
4 south, we have the Sedgwick recharge site, and the
5 Sedgwick surface water gage.

6 Next slide. The term permits you're familiar
7 with of 42 cubic feet per second from April
8 through -- April 1st through September 30th, and
9 20 cubic feet per second from October 1st through
10 March 31st each year for the Highway 50 gage. I'll
11 display a little information on how frequently that
12 occurred during the demonstration period. I'll also
13 present some of the measured ground water levels as
14 well as some of the information -- well, as a
15 summary at the Sedgwick site, the minimum that we've
16 had is 100 days per year that have exceeded permit
17 flows and that happened to be in 2002, which was
18 rather dry down here. Additionally, this is
19 described generally in this report looking at
20 continuous water quality monitors. We have those at
21 those two sites for specific conductance,
22 temperature, pH, dissolved oxygen and turbidity, and
23 those are used to estimate chloride and other
24 constituents of interest.

25 We did rather extensive water quality sampling

1 throughout the demonstration period, and since then
 2 we have continued. I believe we've collected
 3 probably another 600 samples since the demonstration
 4 project ended. More than 4,000 samples were
 5 analyzed for as many as 400 chemicals that are on
 6 the EPA MCL list. I'm sorry, maximum contaminant
 7 level list, and it includes, and I kind of
 8 aggregated these together by their constituent
 9 grouping, or chemical grouping: Major ions,
 10 nutrients, trace elements, radionuclides, bacteria,
 11 herbicides, pesticides, volatile organic compounds,
 12 other organic compounds. If you want to know
 13 specifically what was analyzed for, it's on table
 14 three, pages 14 through 17, and the City Exhibit --
 15 yeah. Next.

16 Of all of those constituents with all of the
 17 samples that were collected, constituents of concern
 18 were defined, and the way that we defined those in
 19 consultation with Kansas Department of Health &
 20 Environment and U.S. Environmental Protection Agency
 21 Region 7 were those chemicals that frequently --
 22 frequently being defined as 20 percent of the
 23 samples -- exceeded drinking water standards. Based
 24 on those more than 400 constituents and chemicals
 25 that were analyzed in surface water, those chemicals

1 were sodium, chloride, total coliform bacteria and
 2 atrazine. And in groundwater it was nitrite plus
 3 nitrate, arsenic, iron and manganese.

4 I need to clarify a couple things on this
 5 slide. The sodium exceeded a drinking water level
 6 that's called the drinking water effects limit
 7 that's really -- it's a advisory level for people
 8 with heart conditions, so it's not really a primary
 9 drinking water standard. Chloride is a secondary
 10 drinking water standard for aesthetics; in other
 11 words, it tastes salty. Total coliform bacteria is
 12 established as a goal of zero, since we can only
 13 measure less than one, that's the true detection
 14 limit of that, and that's because it's
 15 association -- or indicator organism for other
 16 viruses and things that could cause you to have
 17 gastrointestinal illnesses. Atrazine, because of a
 18 proposed increase in cancer risk associated with
 19 that chemical. Nitrite plus nitrate has a maximum
 20 contaminant level of 10 milligrams per liter. That
 21 can cause what's called blue baby syndrome.
 22 Arsenic. At the time -- I need to make a note on
 23 arsenic. At the time of the demonstration project,
 24 the maximum contaminant level for arsenic was 50
 25 parts per billion or micrograms per liter. We

1 really did not have any examples exceed 50
 2 micrograms per liter throughout the demonstration
 3 phase. The reason I have added that on is because
 4 now the -- effective January of 2006 the maximum
 5 contaminant level for arsenic will be 10 micrograms
 6 per liter. And that is a primary drinking water
 7 standard. Iron and manganese are secondary drinking
 8 water standards. They just -- because it will cause
 9 laundry to get stained and it can also cause the
 10 taste to not be too good.

11 Next. Part of how to measure whether -- or
 12 one of the things that was a very important
 13 objective for looking at the effects of recharge is
 14 to first define what the baseline concentrations of
 15 some of these chemicals were. You see this very
 16 wide bar, and I apologize. This is a nice complex
 17 graph. All of us scientists are kind of nerdy and
 18 we like to have all kinds of stuff on our graphs. I
 19 noticed you laughed. Sorry. This range goes from
 20 less than five milligrams per liter which was the
 21 detection limit for chloride up to -- at this site
 22 in the pre-recharge period the maximum concentration
 23 we had was just under 400 milligrams per liter.
 24 During -- I'll show a slide later that chloride
 25 concentrations can get as high as 930 milligrams per

1 liter in the surface water. This is really here for
 2 illustrative purposes to show here's the standard
 3 line of 250 milligrams per liter. Here's all the
 4 varying background concentrations that we detected
 5 in various wells throughout the study area, and
 6 here's what it is in the river. This little bar is
 7 the median or middle concentration of all of the
 8 samples that we collected, so that's the value at
 9 which half are higher than that and half are lower
 10 than that.

11 I think the best way to summarize this is that
 12 chloride frequently exceeds 250 milligrams per liter
 13 in the Little Arkansas River; therefore, it is
 14 something that the project needed to be concerned
 15 with. I think, interestingly enough, the shallow
 16 monitoring wells at the diversion site, at the
 17 Halstead diversion site, very frequently get close
 18 to that limit and have naturally high
 19 concentrations, even in a background condition.

20 Next slide. Likewise for atrazine, background
 21 concentrations in the Little Arkansas River can get
 22 quite high, up to a maximum value of 46 micrograms
 23 per liter or parts per billion. At the Halstead
 24 site, likewise, before any recharge activities
 25 occurred, atrazine is detectible in groundwater

1 almost throughout the entire area at all of the
2 sites that were sampled, and during the background
3 sampling got as high as about a half of a microgram
4 per liter.

5 This is just a diagram to show the location of
6 the diversion site with the well within 50 feet of
7 the river, and I'll probably highlight on some
8 following slides, this EB-145-A1, which is the -- a
9 shallow screened interval well nearest the river,
10 and right next to it, actually in a nest, is a deep
11 well that's screened in the lower five feet of the
12 aquifer called PD5. These wells and some of the
13 chemistry associated with these will kind of show
14 some of the effect of diversion and the relation to
15 the chemistry in the Little Arkansas River.

16 Next slide. A schematic of the recharge site
17 just to kind of get you located. There were two
18 basins at the site, monitoring wells on the eastern
19 side and western side near a recharge trench, and
20 I'll talk generally about some of the water quality
21 at those sites.

22 Next slide. There's been a couple of people
23 that have testified relative to the perched water
24 tables. This is at the Halstead recharge site, and
25 it's a hydrogeologic cross-section. In essence, the

1 diverted, and you can see the -- I guess that's
2 purple, the purple line is the PD5 deep piezometer
3 at the site, and the black line is the shallow well
4 at the site that I mentioned earlier, the A-1.

5 When the pumps are turned on, the groundwater
6 levels immediately adjacent to that decrease in
7 response to that additional pump stress; however,
8 when those pumps are turned off they respond and
9 rebound almost immediately, and Jerry had a
10 really -- a very good plot. I didn't -- you can see
11 this is the further -- further extent wells that are
12 out further, a quarter mile or so away from the
13 stream, this showed those that those water levels
14 not only rebounded, they actually increased compared
15 to some of the initial pumping periods. I think one
16 of the things that related to the chief engineer's
17 questions of when can this occur, I kind of
18 summarized here from the report that there's a
19 number of days each year that you will have above
20 base flow conditions or conditions that exceed the
21 permit requirements.

22 Next slide. Water levels at the recharge site
23 increased during recharge and receded when the
24 recharge stopped, which I guess would make sense.

25 Chloride concentrations at the diversion site.

1 shallowest monitoring wells are screened at about
2 30 -- at the bottom of the well is at about 30 feet
3 below land surface, and the water level is at about
4 20 feet below land surface. Here's the relative
5 position of the recharge trench relative to those
6 water levels, and I think most importantly is this
7 clay layer here in this fairly clayey zone here that
8 cause that water level to more or less be segregated
9 from the deeper most part of the aquifer, this
10 sandier zone down here, that has a static water
11 table, at least it did before any recharge
12 activities have occurred, of about 50 feet below
13 land surface.

14 Next slide. Jerry has -- Jerry Blain
15 presented a number of -- or a slide. This is a
16 different modification of a similar slide to show
17 the recharge period and the data collected during
18 those periods. The top draft shows the stream
19 stages -- or the stream flow relative to the
20 stair-stepped fashion of the permit withdrawal
21 guideline. This next chart shows the river stage at
22 the site right next to the diversion well and its
23 variation throughout the year. And this is a plot,
24 by the way, from 1995 through July of 1998. The
25 gray bands are the period when water was being

1 The top graph shows chloride concentrations in the
2 surface water that are highly variable, as I said
3 before, this line is the 250 milligram per liter
4 secondary drinking water standard line. There's the
5 maximum concentration at 930 milligrams per liter
6 that occurred during the recharge periods. That was
7 in the river. These are the chloride concentrations
8 in the wells immediately adjacent to and the
9 diversion well. This line that looks continuous is
10 just a -- all of the points where we collected
11 samples. We collected samples daily. When the
12 diversion well was initially turned on for the first
13 time the concentration in the diversion well was
14 20 milligrams per liter. At the end of about 105
15 day pump test, our continuous pumping cycle, the
16 concentration rose to, if I recall correctly,
17 55 milligrams per liter. We had this rather
18 extensive almost one year period where the diversion
19 well was not turned on. The well was turned on and
20 very quickly reached an equilibrium of around
21 60 milligrams per liter. I think an important thing
22 to note is this statement I have here: The deep
23 well PD5 concentrations increased from this
24 background concentration of 14 milligrams per liter
25 to 60 milligrams per liter because surface water was

1 being induced into the groundwater. The average
 2 concentration of the groundwater is usually
 3 around -- it depends on the time period you pick,
 4 but it's usually at least 150 milligrams per liter.
 5 Likewise at the recharge site background
 6 concentrations varied from 8 milligrams per liter to
 7 290 milligrams per liter. After recharge was begun,
 8 there -- once again the diversion well water quality
 9 is around 60 milligrams per liter. So that water is
 10 being recharged and very quickly you reach an
 11 equilibrium, and in essence that recharge water, the
 12 volume that's put into the system, overwhelms the
 13 existing water quality and it becomes the same as
 14 the diversion water quality. I think interestingly
 15 in this case that caused a rather large improvement
 16 in the water quality in one of the shallow wells,
 17 and in some of the deep wells those concentrations
 18 increased from about 10 milligrams per liter to
 19 60 milligrams per liter.

20 Likewise for atrazine concentrations, this is
 21 a very similar plot to the one I had for chloride.
 22 You have atrazine in the surface water. The gray
 23 bands are the pumping periods, and these are the
 24 wells immediately adjacent to the stream and the
 25 diversion water quality. I think the bottom line

1 here is that the deep well PD5, the concentrations
 2 increased from around detection, less than
 3 detection, of .001 parts per billion to .08
 4 micrograms per liter because the surface water was
 5 being induced into the groundwater. The -- you
 6 know, again, like -- the atrazine concentration in
 7 the surface water averages about -- just under 3
 8 micrograms per liter which is the maximum
 9 contaminant limit.

10 At the recharge site, the initial background
 11 concentrations in the shallow well at -- on the east
 12 side of the recharge site was .14 micrograms per
 13 liter. After recharge activities no concentrations
 14 exceeded that, and, in essence, after recharge the
 15 concentrations decreased to about this .08 to .09
 16 microgram per liter level.

17 Next slide. Likewise at the Sedgwick recharge
 18 site, this is a schematic. This is a wholly --
 19 recharge here is done just through the surface
 20 spreading basins. I forgot to mention that
 21 previously at the Halstead site, that the vast
 22 majority of the recharge was done through a recharge
 23 or injection well.

24 Next. From the standpoint of the
 25 demonstration project, one of the things that was

1 important was to look at the different hydrogeology
 2 that might be encountered. You'll notice right here
 3 is the water level. This is the water level in both
 4 the shallow screened interval level and the deep
 5 screened interval are identical. In essence, at
 6 this location the aquifer is completely unconfined
 7 and there is no perched layer. I might also point
 8 out that the water level at baseline conditions
 9 before recharge activities was 30 feet or so below
 10 ground surface, and it's 20 feet below -- there's a
 11 difference of 20 feet below the bottom of the
 12 recharge pits and the baseline water level.

13 Next. During all of the recharge activities
 14 that are contained in this report through July of
 15 1998 the water levels increased about 10 feet, so it
 16 was still well below the bottom of the recharge
 17 basins. And once again, groundwater levels
 18 increased during recharge and receded when the
 19 artificial recharge stopped.

20 Next one. Atrazine concentrations are a
 21 little different issue to deal with. At the
 22 Sedgwick site, that was a surface water intake where
 23 the water was withdrawn, treated, had powder
 24 activated carbon added to remove atrazine and other
 25 pesticides or other organic compounds that might be

1 in the water. What you see here are three years of
 2 two a day samples, roughly, of atrazine
 3 concentrations. And so you can see that
 4 variability. Here is the last period where recharge
 5 activities during the pilot operation were done, and
 6 this purplish reddish line is the actual treated
 7 water at the recharge basins immediately before it
 8 was recharged. In essence, the concentrations
 9 decreased to -- through treatment, to baseline
 10 concentrations, which were about .3 micrograms per
 11 liter. Okay. That took us through the period
 12 through 1998.

13 Now I've only got three more slides on the
 14 water quality from the demonstration project. This
 15 takes us the rest of the way through December of
 16 1990. And I guess there's a lot of information on
 17 these slides, but the bottom line is the chloride
 18 concentrations in groundwater at both recharge sites
 19 were generally less than in the surface water site,
 20 were substantially less than drinking water
 21 standards for chloride, and approximated the
 22 concentrations in the diverted water. The reason
 23 that's important is if you monitor the diverted
 24 water, you know what you're going to be doing to the
 25 aquifer system.

1 Next slide. This is a little different. This
 2 shows the difference in the arsenic concentration
 3 going from 50 -- or I -- excuse me, the arsenic
 4 maximum contaminant level going from 50, so here's
 5 where we did all of our baseline work through 1998,
 6 there are no concentrations above that line. Then
 7 the maximum contaminant level was changed or
 8 proposed to be changed permanently in 2006, to 10.
 9 Now we have samples that are above that line, and
 10 that's why the arsenic is the -- is an important
 11 issue to deal with. The Little Arkansas River does
 12 have concentrations that exceed the drinking water
 13 standard during varying load conditions, usually
 14 during a low flow condition, which I thought was
 15 interesting. The diverted well water quality had
 16 probably the largest concentrations of any of the
 17 sites that we looked at. In some ways that was --
 18 probably made it a good test. It runs right around
 19 20 micrograms per liter. Then at the recharge sites
 20 we in essence -- this band that you see -- these
 21 points here are the before recharge concentrations,
 22 and the bar is the median of all the concentrations
 23 after recharge. So, in essence, for the Halstead
 24 site, recharge -- before recharge concentrations
 25 were just under 10 micrograms per liter, except at

1 one well, and after recharge one well was over the
 2 10 microgram per liter concentration. And that's
 3 contained in the text of -- I believe that's Exhibit
 4 G. Implications. Yeah. This -- I'm sorry. The
 5 previous slide was from Exhibit G, City Exhibit G.
 6 Arsenic concentrations. The slide that Jerry
 7 Blain presented showed pretty much the same thing as
 8 this does. Arsenic concentrations are much less
 9 than the current drinking water standard at the
 10 Sedgwick recharge site, and that's it.
 11 Next slide. Atrazine is present in the
 12 surface water at both the Halstead and Sedgwick
 13 sites at times getting quite high up to 4 to 6
 14 micrograms per liter. Median atrazine
 15 concentrations in both the recharge sites were less
 16 than .1 micrograms per liter. I forgot to mention
 17 that previously. I believe that the Kansas
 18 Department of Health and Environment's current
 19 detection limit for their analytical techniques is
 20 .2 micrograms per liter, so some of those previous
 21 slides that I'd illustrated at the Halstead recharge
 22 site that showed some of the increases in some of
 23 the concentrations would have all been nondetects
 24 with those chemical analytical methods.
 25 Next slide. One of the other important issues

1 was the compatibility of water for recharge. This
 2 actually works out pretty well. You can't see a
 3 difference. There's actually two sets of lines on
 4 each of these plots and you can't see that. That
 5 means that the recharged water quality and chemistry
 6 is similar. Part of what was discussed in Exhibit F
 7 was future monitoring and monitoring requirements to
 8 be able to examine variability, and in that we
 9 developed relationships between specific
 10 conductants, which is a very easily measured
 11 parameter that you can do on a continuous basis or
 12 on a realtime basis and develop the relationships
 13 between specific conductants and chloride
 14 concentrations for these sites to where that could
 15 be used to estimate a chloride concentration to help
 16 supplement monthly sampling of source water or
 17 quarterly sampling of groundwater, which, based on
 18 what we saw, based on the variability of what we saw
 19 in the concentrations in these systems were probably
 20 adequate to monitor the changes in water quality for
 21 the project.
 22 So more than 4,000 samples were collected and
 23 analyzed for more than 400 chemicals and bacteria
 24 and surface water and groundwater before and after
 25 recharge. Before recharge, fecal coliform,

1 chloride, and atrazine frequently exceeded maximum
 2 contaminant levels in surface water, and at the
 3 Halstead recharge site, groundwater in one well at
 4 the Halstead recharge site groundwater in one well
 5 at the Halstead site exceeded the 2001 MCL of
 6 arsenic -- for arsenic of 10 micrograms per liter.
 7 That actually happened before and after recharge.
 8 And concentrations of all of the constituents in the
 9 groundwater are similar to those before recharge.
 10 After the six years of recharge that occurred.
 11 There's been presentation and discussion of
 12 some of the importance of doing the index well
 13 network to define the general water quality and
 14 quantity as part of an accounting system.
 15 Next. That's the general locations. As
 16 previous testimony has talked about, each one of
 17 those representing of roughly four square mile area
 18 and that it was developed in concert with GMD2 and
 19 Kansas Geological Survey.
 20 This is a summary table of the index well
 21 water quality for chloride, sulfate, nitrite plus
 22 nitrate, arsenic and atrazine. Each one of those 38
 23 index well sites, so there's 76 total wells, there's
 24 a shallow well and a deep well at each of the 38
 25 sites, have been analyzed six times since November

1 2001. This data table was -- and some subsequent
 2 figures are City Exhibits S through W. And I'll
 3 highlight a couple of things here. This is all
 4 baseline or background information at these sites.
 5 Chloride concentrations in the shallow wells exceed
 6 the 250 milligram per liter drinking water criteria
 7 or water quality criteria in five percent of the
 8 sites. The same at the deep wells. Sulfate exceeds
 9 at 21 percent of the sites for shallow, 13 percent
 10 deep, and rather than go through each one of those,
 11 I'll show you graphically what that looks like --
 12 oh, I guess I'll -- after this slide. Organics were
 13 detectable at very small concentrations. Most of
 14 these are associated with pesticides. They're
 15 degradation products, like metolachlor oxanylic
 16 acid. That's what OXA stands for. But none of the
 17 organic compounds that were analyzed exceeded the
 18 water quality standards in any of the wells.
 19 Okay. Average chloride concentrations. The
 20 way this is set up, rather than have the nice
 21 contour map that Jerry put up, I've got big dots.
 22 So the big red dot means that the shallow only at
 23 that particular location, the average concentration
 24 of chloride exceeded 250 milligrams per liter at
 25 that site. Down here near the Arkansas River,

1 there's two sites -- or there's one that's split in
 2 half. That means both the shallow and deep exceeded
 3 250 milligrams per liter, and if it's just a
 4 filled-in blue, that means only the deep did.
 5 Next slide. Sulfate concentrations are a
 6 little more prevalent throughout most of the area
 7 exceeding the drinking water standard. Nitrite plus
 8 nitrate only exceeds the drinking water standard in
 9 the shallow wells. And this is the map that
 10 Mr. Blain presented earlier that he had the contours
 11 on. The deep zone has most of the concen -- or most
 12 of the sites with exceedances of 10 micrograms per
 13 liter, but there are a few shallow wells that also
 14 exceed 10 micrograms per liter in the groundwater
 15 for arsenic.
 16 Next. And all of the other slides that I
 17 presented were where concentrations exceeded a
 18 drinking water standard. In this case, this is
 19 where atrazine concentrations were detected at least
 20 once exceeding .1 micrograms per liter. All of
 21 these or nearly all of these detections are in the
 22 shallow wells and in essence you don't see it in the
 23 deep wells.
 24 The reason I present all of these is that this
 25 sets up the background information to look at

1 subsequent potential effects of -- on water quality.
 2 Next. And so a summary of all of this is the
 3 larger chloride and sulfate values generally occur
 4 near the Arkansas River and the area near Burrton.
 5 Nitrate, arsenic and atrazine are relatively well
 6 distributed or evenly distributed throughout the
 7 area. Nitrate concentrations are highest in the
 8 shallow wells. Arsenic concentrations are highest
 9 in the deep wells, and atrazine is detected most
 10 frequently in the shallow wells. However, none of
 11 the samples exceeded any water quality standards.
 12 Next slide. That's it. That's an extra.
 13 That's one I forgot to delete.
 14 Q Mr. Ziegler, you, through this process, obviously
 15 have gathered and analyzed lots of data from the
 16 monitoring wells. It looks to me as if in addition
 17 to the distribution of various contaminants that
 18 there were a few other conclusions that could be
 19 drawn. I want to see if these are accurate. One
 20 was that it appears when recharge into an area stops
 21 the groundwater levels there decrease.
 22 A Correct.
 23 Q What does that mean do you?
 24 A That means that you temporarily increase that
 25 storage and that once you eliminate that additional

1 volume of water, it will more or less spread out
 2 into the rest of the aquifer.
 3 Q Second, it seems to me to be that there's clear
 4 evidence here that in fact the wells have the effect
 5 of inducing stream water into the diversion wells,
 6 is that right?
 7 A Based on the water quality and water level
 8 information, that's true.
 9 Q And that the recharge water that is used end up to
 10 be of a similar chemistry to the baseline
 11 groundwater chemistry at the recharge sites.
 12 A The water quality that's at an existing location,
 13 when you add the recharged water --
 14 Q Right.
 15 A -- then the groundwater at that location will look
 16 like the recharge water.
 17 Q Okay. Do you have anything else you'd like to add
 18 from your -- to your testimony?
 19 A Not at this time.
 20 MR. HINKLE: Okay. Could I have a
 21 moment, Mr. Pope?
 22 (Off-the-record discussion.)
 23 MR. HINKLE: Thank you. I have no
 24 further questions.
 25 HEARING OFFICER POPE: Mr. Adrian.

1 MR. ADRIAN: Thank you.
 2 CROSS-EXAMINATION
 3 BY MR. ADRIAN:
 4 Q I think at the outset you described yourself as
 5 the -- or your position as project chief for the
 6 equus beds recharge project.
 7 A **That's one of my titles.**
 8 Q Is that the appropriate --
 9 A **Yes.**
 10 Q And that is a designation given to you by the USGS?
 11 A **Yes.**
 12 Q And so how much time then percentage-wise, for
 13 example, have you spent on this project? Is that
 14 100 percent of your time or is it just part of your
 15 time?
 16 A **I've spent at least 25 percent of my time on this**
 17 **project since 1995.**
 18 Q During that period of time since 1995, then, have
 19 you -- would you describe yourself as having been
 20 intimately involved with the city's learning process
 21 in regard to this project?
 22 A **You'd have to define the learning process and**
 23 **intimate a little bit more clearly.**
 24 Q How much have you been in communication with the
 25 city with regard to this rather voluminous

1 information that you have?
 2 A **We frequently -- we distribute and update on a -- I**
 3 **would say roughly a quarterly basis, just as a**
 4 **routine. The information and all of the data once**
 5 **it's quality assured is presented on our website.**
 6 **We've participated in annual meetings, public**
 7 **meetings in the Halstead-Sedgwick area. At least**
 8 **phone discussions every couple of weeks probably**
 9 **with some small aspect of the project or the water**
 10 **quality data or the groundwater data.**
 11 Q Well, it would appear to me that your -- that the
 12 information that you have accumulated would be
 13 extremely valuable to this project and valuable to
 14 the city, would it not?
 15 A **I think it's valuable to all of the folks within the**
 16 **study area.**
 17 Q And they, to your knowledge, they have seen it, had
 18 access to it and used it in their formulation of the
 19 project.
 20 A **Yes.**
 21 Q Have you had an opportunity also to view their
 22 applications?
 23 A **I briefly skimmed them. I would not say that I've**
 24 **reviewed them.**
 25 Q Then have you had an opportunity to view the

1 recommendations of the Groundwater Management
 2 District in regard to those applications?
 3 A **Again, I briefly skimmed them.**
 4 Q So really your -- you would not have enough
 5 knowledge of either the application or the
 6 recommendations or the Memorandum of Understanding
 7 to say whether those will accomplish the protections
 8 that are hoped to be accomplished through the
 9 recommendations of the district.
 10 A **That's correct, I don't have enough knowledge.**
 11 MR. ADRIAN: Okay. I have no other
 12 questions.
 13 HEARING OFFICER POPE: Mr. Hinkle, any
 14 redirect?
 15 MR. HINKLE: No, thank you.
 16 HEARING OFFICER POPE: Mr. Rolfs?
 17 MR. ROLFS: I have no questions.
 18 HEARING OFFICER POPE: Mr. Bagley?
 19 EXAMINATION
 20 BY HEARING OFFICER POPE:
 21 Q Mr. Ziegler, I want to just follow up just real
 22 briefly on a couple of points. If I'm looking at
 23 what's page 41 of your Power Point slides, do you
 24 have a copy there so you can --
 25 A **Yes.**

1 Q -- put it back up? For each of these -- in fact,
 2 without going into a lot of detail, but just the
 3 caption on the slide says compatibility of water for
 4 recharge. Recharge water is of similar chemistry to
 5 baseline groundwater chemistry at recharge sites.
 6 And then these little figures on here. Are you
 7 saying for the -- for these particular identified
 8 sites that they're very close? I mean, if you look
 9 at the Halstead recharge site, for example, I see a
 10 variety of lines there on those little figures.
 11 A **Right.**
 12 Q You're saying you don't see much change in chemistry
 13 there between the water -- and this is all based on,
 14 what, the pilot project?
 15 A **Correct. This is a --**
 16 Q The demonstration?
 17 A **Demonstration project, right. What this is is a --**
 18 **it's called a stiff diagram, but it's a plot of the**
 19 **milliequivalents, the amounts of the major ions in**
 20 **the water, and in particular the site you're**
 21 **referring to, that very large -- the biggest, the**
 22 **most outward line, that is that shallow well on the**
 23 **west -- or excuse me -- shallow well on the east**
 24 **side of the Halstead recharge site that happens to**
 25 **be in fairly close proximity to a individual's**

1 sewage lagoon. And I suspect the reason that
 2 chemistry looks relatively dissimilar is because
 3 there is some small impact or some impact on the
 4 groundwater at that site.
 5 Q Okay. So there may be some of that upper water
 6 being induced into the lower water there. Is that
 7 what you're saying?
 8 A I think at that shallow well at that site, the --
 9 what happened in the recharge basins, the background
 10 water quality at that site was affected by the
 11 sewage lagoon adjacent to it.
 12 Q Okay. I guess I'm trying to reconcile in my mind
 13 testimony I think I heard a few minutes apart from
 14 that about if -- when you recharge water into a
 15 site, then it's going to look like the recharge
 16 water, the groundwater is going to take on the --
 17 essentially the properties, but if -- but if they're
 18 reasonably similar, then that's not going to be much
 19 of a change, is it not?
 20 A Correct.
 21 Q But if they're not reasonably similar, you will see
 22 a change?
 23 A Correct. And in that particular instance, that was
 24 the site that had 290 milligrams per liter of
 25 chloride, and the recharge water was 60, so the

1 concentration decreased from 290 to 60 for a period
 2 of time.
 3 Q Now, at the location of the recharge -- or not the
 4 recharge -- the bank storage well, did I understand
 5 you to say earlier that when that well was pumped
 6 the quality of water in the lower part of the
 7 aquifer did change to more reflect the constituents
 8 in the river water?
 9 A Correct.
 10 Q And was that more of a local effect in terms of
 11 inducing water down into -- essentially replace the
 12 pumped water from the deep well or the deep zoned
 13 area, how far out did that go? Was that just
 14 locally where the well was?
 15 A I don't know.
 16 Q Just where you measured it was.
 17 A Yes.
 18 Q But in general terms, there were some different
 19 constituents in river water and sort of the upper
 20 part of the groundwater as compared to the lower
 21 groundwater, that it showed continuity between those
 22 two. Is that --
 23 A We saw increases in the concentrations of chloride
 24 and atrazine that were present in the shallow
 25 groundwater and in surface water at that site, but

1 before the diversion well was pumped we did not see
 2 those in the deep groundwater.
 3 HEARING OFFICER POPE: Okay. I don't
 4 think I have any further questions unless I've
 5 generated some others. Thank you very much.
 6 Let's take a quick break here, less than 10
 7 minutes, while we get set up for the next witness.
 8 (There was a recess from 3:09 p.m.
 9 to 3:18 p.m.)
 10 HEARING OFFICER POPE: Mr. Hinkle, are
 11 you ready?
 12 MR. HINKLE: I am. Thank you.
 13 HEARING OFFICER POPE: Call the hearing
 14 back to order, and you may call your next witness.
 15 MR. HINKLE: City calls Mr. David Stous
 16 as a witness.
 17 DAVID STOUS,
 18 called as a witness, having been first duly
 19 sworn, testified as follows:
 20 DIRECT EXAMINATION
 21 BY MR. HINKLE:
 22 Q Do you have the microphone there, Mr. Stous?
 23 A Yes, I do. Is it okay?
 24 Q Okay. Great. Sure. Would you please give your
 25 name and your educational background and current

1 employment status.
 2 A Yes. My name is David Stous. I'm employed by Burns
 3 & McDonald Engineering Company. I've been with them
 4 for 31 years. I have a bachelor of science degree
 5 in earth science in 1971 from Central Missouri State
 6 University, I have a master of science degree in
 7 water resources science from the University of
 8 Kansas in 1978. I'm also a registered professional
 9 engineer and a registered professional geologist.
 10 I'm also a licensed well driller in the state of
 11 Missouri, which is required for design of wells.
 12 Q In your employment with Burns & McDonald, have you
 13 been involved with the city of Wichita aquifer
 14 storage and recharge project?
 15 A Yes, sir. I've been involved since the water supply
 16 study in 1993.
 17 Q What particular is your aspect? What aspect do you
 18 have in the project?
 19 A I am a hydrogeologist and I help evaluate the
 20 hydrogeology concerns, including the modeling, test
 21 drilling and aquifer analysis.
 22 Q What is the purpose of the groundwater model that
 23 was developed here?
 24 A Okay. The groundwater model was used from the start
 25 with the water supply -- or the aquifer storage and

1 recovery feasibility study for several purposes. It
2 was to help determine feasibility of the recharge
3 project, the aquifer storage and recovery project,
4 to help evaluate changes in the storage volume, and
5 to look at impacts of various rates of filling, what
6 happens to river infiltration and exfiltration of
7 the different rivers. And again to help establish
8 the guidelines for the future project. Later the --
9 it was evolved into a tool -- it is still evolving
10 into a tool to use with the accounting methodology.

11 Q Can you please describe the model development.

12 A Yes, sir. The model that we currently have has had
13 quite an evolution, several generations of the
14 model. We used a MODFLOW model, which is a finite
15 difference model that was developed by the USGS,
16 modeling methodology that was developed by the USGS
17 and is accepted by many agencies as a valid model.
18 The model configuration that we used is based on a
19 model originally put together and generated by the
20 USGS. That model is described in City Exhibit H
21 that was essentially completed by Nathan Meyers of
22 the USGS and is entitled: The hydraulic and
23 chemical interaction of the Arkansas River with the
24 equus beds aquifer between Hutchinson and
25 Wichita-South Central Kansas. He prepared that

1 have a figure on the wall that shows the model
2 outline in relationship to Hutchinson, the Arkansas
3 River, Wichita, and the Little Arkansas River.
4 That's an area about 40 miles by 24 miles. The --
5 let's see, I think the next slide will show -- yeah,
6 I think -- that shows the model grid that the USGS
7 used. Now, the grid spacing along the rows is finer
8 along the river and the area of interest, and the
9 grid spacing in that area is about 1,000 feet wide
10 and the column spacing is 5,000. And as we step out
11 away from the area of interest the grid spacing
12 increases until at the model boundary essentially
13 outside of the area of interest of Nathan's study,
14 the spacing is 5,000 by 10,000 feet. That's the
15 model boundaries.

16 The next slide and on the poster board shows
17 the conceptual model that the USGS used. This is
18 our figure -- our conceptual model is similar.
19 There's no significant changes between the
20 conceptual models between the USGS and our model.
21 And the important points on this conceptual or
22 cartoon of how the model was put together shows that
23 there are three layers: There's an upper layer,
24 middle layer and lower layer. At the edge of the
25 model in some places are no flow boundaries; in

1 model over a fairly large area to look at
2 interaction, specifically chlorides. As Mr. Ziegler
3 earlier testified, he gave some of the findings of
4 that model as reported in this result -- in this
5 report. That model was obtained by the Bureau of
6 Reclamations to perform further studies under
7 contract to the Groundwater Management District.
8 They attained the same model and refined it, and
9 I'll go into greater detail about that in a minute,
10 to do contaminant transport studies and analyze the
11 migration of chlorides through the equus beds, and
12 that is contained in City Exhibit J, which is the
13 Arkansas River water management improvement study,
14 modeling of chloride transport in equus beds model.
15 So they refined the model, and then Burns McDonald
16 obtained that model from the USBR, so it's
17 refined -- this is kind of a third stage of
18 refinement that we did. We refined the model in the
19 well field area to get better resolution of the
20 model within our area of interest.

21 Now going to the -- a bit of the details of
22 the USGS model and some of the parameters used.
23 Nathan Meyers initially set up his model covering an
24 area that is about 24 miles wide and 40 miles long,
25 and it's oriented parallel with the Ark River. We

1 other words, it's where the aquifer meets bedrock,
2 and so there's negligible flow between the bedrock
3 and the aquifer. And the lower boundary, again, is
4 the bedrock and there's negligible flow at that
5 point. Nathan assigned hydraulic parameters for
6 each of the layers based on some analysis that he
7 did. Additionally, we have river input, both --
8 either seepage into the aquifer or seepage from the
9 aquifer to the river, the Ark River and the Little
10 Ark River. There's evapotranspiration occurring
11 that's accounted for. There's discharge through
12 wells that's accounted for. There's recharge by
13 precipitation that is accounted for. And then as we
14 go into modeling the recharge project, there's
15 artificial recharge accounted for. Let's see.
16 I...

17 Q Mr. Stous, the conceptual model that you have is DWR
18 Exhibit P, is that correct?

19 A That's contained in the -- some of the modeling
20 material that was given to DWR in response to one of
21 the letters and I think it's contained within
22 Exhibit P, yes. The -- in discussing some of the
23 parameters of the model -- let's see. As I
24 mentioned, the aquifer parameters include the
25 hydraulic conductivity of each of the layers. And

1 Mr. Meyers had several pumping tests, mainly along
2 the Ark, to establish the hydraulic conductivity of
3 the layers. He also used throughout his model
4 electric logs and geologic logs to define the
5 boundary between each of the layers, and for the
6 precipitation recharge he used -- the precipitation
7 recharge varies throughout the model, depending on
8 soil types and grade or slope of the soil.

9 Now, he used the average precipitation from
10 three stations within the modeling area to come up
11 with what the initial precipitation was. For the --
12 okay. I'll talk a little bit more about that in a
13 minute when I get to the transient model.

14 The next value that he used or parameter that
15 he looked at was evapotranspiration, and that is a
16 function of soil types and how high the water
17 table -- or how close the water table is to the
18 ground surface. Evapotranspiration is the most at
19 the surface, and then as the water table drops or is
20 lower than the surface, there's a percentage of the
21 maximum evapotranspiration occurs, and then at some
22 point there's no evapotranspiration because the
23 groundwater is too deep, and that's called the
24 extension point. And that's set in the model -- in
25 the USGS model at about 10 feet. And I think the

1 value of evapotranspiration was just established by
2 the calibration process.

3 The next parameter that was looked at was
4 stream flow. For the steady state model he used
5 stream flow that represents an average stream flow
6 in the pre-1940s time frame. And in -- like I say,
7 in the predevelopment there's essentially no pumping
8 by wells. He established a steady state model
9 initially to try to match the reported 1940 levels,
10 and as a starting point for his further modeling
11 analysis. He performed a calibration operation for
12 the steady state model that included increasing and
13 decreasing some of the model parameters to see what
14 impact they would have on the water levels and the
15 closeness of that between the modeled and recorded
16 1940 water levels.

17 In that calibration process he had an absolute
18 difference between observed and modeled water levels
19 of 3.2 feet. So the model that came within an
20 absolute difference of 3.2 feet; however, that
21 ranged from about two and a half feet to over four
22 and a half feet, the four and a half feet being out
23 in the well field area. That was not his --
24 necessarily his primary focus of his study. And he
25 didn't have a lot of information to find a model in

1 that area, but the 3.2 feet in the steady state
2 model is considered fairly good.

3 Q Mr. Stous, let me see if I understand this
4 correctly. Your discussions here of a model are
5 describing a tool you used for prediction that is
6 based upon actual measurements out in the field and
7 then you use it to see how close it comes to
8 reality, is that correct?

9 A That's correct.

10 Q And these ranges that you've described here, with
11 the absolute difference of 3.2 feet, is a
12 description of the accuracy of that model, is that
13 right?

14 A That's correct.

15 Q Okay.

16 A That's correct. After the steady state model was
17 established, established starting water levels for a
18 transient model that he used for his further
19 analysis, there's some additional parameters that a
20 transient model has that a steady state does not.
21 That includes specific yield and specific storage
22 that he's set. Those values were -- remain the same
23 through the generations of the model. His transient
24 model was set up in six stress periods covering the
25 period from 1940 to 1989. I think that the six

1 periods generally represent area -- periods of
2 similar precip and pumpage. The -- those were not
3 even time periods, but there were six periods
4 covering that 49 year period. The stream flow was
5 adjusted for each of the stress periods based on the
6 70 percent recurrence at two specific gauges. For
7 the Ark River that was the gage at Hutchinson and
8 for the Little Ark River that is -- it was the gage
9 at Valley Center. And then the recharge -- natural
10 recharge from precipitation varied for each stress
11 period. Again, that was the average of the three
12 weather stations within the area, and then scattered
13 throughout the model, depending on soil type --
14 please advance the slides. There's several more.
15 Keep going. A little more. This is the
16 distribution of the recharge factors that Nathan
17 Meyers used in his model. The average -- well, each
18 of the colors have a -- have a recharge factor
19 that's multiplied times the average precipitation at
20 each of those three stations to simulate recharge
21 through that area. So the factor may be slightly
22 over one or slightly under one, depending on the
23 soil types and the -- and the slope of the land.
24 And then he average -- let's see. And then he
25 averaged the pumpage within the five stress -- five

1 major -- or six major stress periods that -- for the
 2 discharge from wells. Again, he went through a
 3 calibration process. This time the overall
 4 calibration is about 4.7 feet throughout the model
 5 and range from a little over two feet to six feet.
 6 Again, that's deemed a fairly satisfactory
 7 calibration. And if I may, I'd like to point out
 8 some of the findings that are in this report, this
 9 exhibit, that I think are significant to our
 10 project. Prior to development the Ark River, with
 11 his findings, was actually a gaining stream through
 12 the reach from Hutchinson to Wichita. Not very
 13 much, but it had a gaining stream of about 21 cubic
 14 feet per second.

15 Now, the Little Ark is a drain for the
 16 aquifer. The aquifer actually ends just a short
 17 distance east of the Little Ark. The aquifer thins
 18 out to bedrock. And so water moving from west to
 19 east through the aquifer is drained by the river, by
 20 the Little Ark River. And in predevelopment times
 21 the average base flow, average drainage from the
 22 aquifer, that water right near the river came up
 23 into the river and was drained away at a rate
 24 throughout the model of about 67 cubic feet per
 25 second. So because of the natural recharge, we have

1 water going to the Ark and to the Little Ark at
 2 those rates. Then his modeling showed that by 1989
 3 the Ark became a losing stream, and in the reach
 4 between Hutchinson and Wichita, it's losing about 52
 5 cubic feet per second of -- of water that has a
 6 median concentration of over 600 parts per million.

7 Q That's concentration of chlorides.
 8 A I'm sorry. Of chlorides, yes. Chlorides. And then
 9 because of the pumpage and reduction of head within
 10 the central part of the well field itself, base flow
 11 in the Little Ark River has dropped from 67 to about
 12 27 cubic feet per second. Then his projections, he
 13 projected what would happen under various pumping
 14 scenarios out to the year 2019. And depending on
 15 the scenario, water levels could drop another
 16 78 feet in some areas. And then the losses from the
 17 Ark River, Arkansas River, could vary depending on
 18 the pumping scenario from 59 to 117 cubic feet per
 19 second. And then he calculated that -- with the
 20 median concentration of 630 parts per million of
 21 chlorides, that at the 1989 time frame there's
 22 approximately 100 tons of chlorides per day moving
 23 from the river into the aquifer. And with pumping
 24 scenarios either the same or continuing, depending
 25 on that pumping scenario in the future, that could

1 increase to 110 to 200 tons per day depending on how
 2 pumping might increase. The -- from his model, the
 3 U.S. Bureau of Reclamation picked up the model to do
 4 additional contaminant transport studies, and if you
 5 could go back some -- I apologize. If you could go
 6 back several. One more, I think. Yes. Okay. This
 7 is the same model area used by Nathan that the U.S.
 8 Bureau of Reclamation used. And because they were
 9 doing contaminant transport studies, the model grids
 10 needed to be a little more square than what they
 11 were. They were rectangular in the Nathan Meyer
 12 study. You get better results with the contaminant
 13 transport studies if these are square, so the Bureau
 14 of Reclamation regridded the area, made them more
 15 square in the area of interest, and they ended up
 16 with a -- the square shapes and the model with the
 17 same area, with better resolution, now has 54 rows
 18 and 84 columns. Again, this is in Exhibit J, figure
 19 9. After they regridded --

20 Q That's city of Wichita exhibit?
 21 A City of Wichita exhibit, yes, sir. After they
 22 regridded it, there's several repairs that have to
 23 be made to some of the boundary conditions,
 24 specifically the river. Some of the parameters have
 25 to be adjusted for the new sizes, and after they did

1 that they reran the calibration and the predicted
 2 heads and water budgets that came very close to the
 3 USGS so they felt it was sufficient to proceed
 4 with -- with -- with the contaminant studies. And
 5 then they used a contaminant transport model called
 6 MT3D that additional parameters with contaminant --
 7 that control contaminant movements were input. MT3D
 8 uses the MODFLOW water budgets and groundwater
 9 levels for the gradients and flow parameters, and
 10 then it tracks how contaminants will be absorbed or
 11 transported from one cell to the other. And then
 12 they presented their findings, and I'll just show
 13 one. I think this is from their report. Shows the
 14 predicted chloride distribution for the year 2049,
 15 the lower model layer. The dotted line is the
 16 general outline of the Wichita well field -- and
 17 let's see. I think I have -- I have that here also.
 18 And one of the predictions is that a 500 milligram
 19 per liter line will be migrating by that time into
 20 the well field from the Ark River, and we have a
 21 close to 500 milligram per liter line from the
 22 Burrton oil plume entering the well field at that
 23 location. Burns & McDonald attained the model from
 24 the USBR. And again the initial modeling objectives
 25 were to evaluate the feasibility of the ASR project

1 and to look at different filling rates, how the
 2 aquifer respond and how water leaking into the
 3 aquifer or leaving the aquifer, what conditions
 4 would control that. Again, the conceptual model is
 5 the same as the USGS, but we needed a better
 6 resolution in the well field area, so we regrided
 7 the model. Again, this is I believe contained in
 8 DWR Exhibit P. It's one of several of model figures
 9 that was submitted in response to some additional
 10 questions by DWR. This model has -- again, it's the
 11 same physical area, but now we've refined the grid
 12 spacings on the model. There are 40 -- I'm sorry.
 13 84 row and 120 columns, so 120 columns this way and
 14 84 rows. And the finest resolution in our area of
 15 interest is 1,000 feet on the side. And again you
 16 see the river nodes -- well, this slide shows -- the
 17 blue are the river nodes, this being the Arkansas
 18 River and this the Little Arkansas River, and you
 19 see some of these nodes are fairly large at the
 20 edge. The whole node is representing a river --
 21 there's river leakage into that node, and as we
 22 refine -- that the model refined the grid, we have
 23 to translate the hydraulic parameters appropriate
 24 for this size of grid, so there's some repair that
 25 has to be done when we regrid. And then we checked

1 this against the heads and the water balance with
 2 the USGS and then had fairly good agreement when we
 3 re-ran this model.
 4 Now, Nathan Meyers had told us that his area
 5 of interest was the Ark River. He had some error --
 6 errors up in this area. This wasn't specifically
 7 his area of interest so that he could withstand a
 8 little more error in that, that specific part of the
 9 model, but that is our area of interest, and we
 10 began additional test hole drilling with the -- the
 11 ASR feasibility analysis which I think is in 1994, I
 12 believe. Since that time we've continued drilling.
 13 We have much better understanding and better detail
 14 of the aquifer characteristics and the layering. So
 15 we've incorporated that soil boring information into
 16 the model up through I believe it's the 1997 boring
 17 investigations that we've had. We use the same
 18 break techniques to try to determine the elevation
 19 of the model layers, the upper and lower layers, and
 20 then went through a recalibration, if you will, with
 21 those adjusted parameters. Let's see. We did look
 22 at the 1940 steady states. We performed a steady
 23 state analysis looking at 1940 levels in -- let's
 24 see. We also -- I don't know if I can cover that.
 25 We also looked at a 1992 steady state model, 1992

1 has the pumping period just prior to the January '93
 2 water level measurements, and we looked at
 3 calibration within the well field specifically at
 4 the index wells. The wells didn't go in till later
 5 so we used interpolated values from 1940 and from
 6 the 1992 pumping periods.
 7 Our calibration residual was 4.5 feet for the
 8 1992, and the model had a error, a mass balance
 9 error, a water budget error of less than
 10 .01 percent, so we felt that was pretty good for the
 11 transient model to set initial water levels for the
 12 next phase of our modeling, which is a transient
 13 modeling to simulate how the aquifer would fill and
 14 the results of flow to the river and from the river.
 15 For the transient modeling we started with
 16 these 19 -- simulating the January 1993 water
 17 levels. We set the stress parameters on one year --
 18 one year time steps. So for every year we adjust
 19 the pumping, which is -- we've obtained from the
 20 water use reports and records that GMD had. The
 21 recharge, again, is the same as -- same procedure as
 22 the USGS used. We looked at the average precip for
 23 those three stations for the year, and then the
 24 model has the adjustment factors for how much
 25 actually goes into -- is recharged into the aquifer.

1 And then the stream flow, again, we look at the
 2 average annual -- or the stream flow, the annual
 3 stream flow at the two gauges that has a 70 percent
 4 recurrence. We did the calibration and looked at
 5 2001 water levels in the index wells. Those were
 6 real measurements at that time the wells went in.
 7 We had an absolute main residual ranging from a
 8 little over two feet to 6.7 feet in that, with a
 9 model budget -- water budget discrepancy of less
 10 than one percent.
 11 Now, I want to point out, you can see how the
 12 models evolve, as we get more data, we can further
 13 refine it. And it's a continual process, I guess,
 14 or can be a continual process as we get more data.
 15 Q Mr. Stous, what --
 16 A Yes.
 17 Q -- do you get for that refinement? What's your
 18 benefit?
 19 A To reduce the absolute residual mean, or, in other
 20 words, to reduce the difference between the observed
 21 and the modeled water level, so we know that the
 22 model more accurately predicts the flow conditions
 23 and the head conditions with the further refinement.
 24 I'll just point out a couple of our initial
 25 findings. This is a graph from the -- continue on,

1 if you would. That one. This is from DWR Exhibit
 2 T, which is the environmental impact statement
 3 that -- and this is a graph of the storage deficit
 4 in the equus beds along the bottom with losses or
 5 gains from the adjacent rivers.
 6 The blue is what's flowing from the Arkansas
 7 River into the equus beds at different storage
 8 deficits in the aquifer. At a deficit of around
 9 250,000 acre feet the model is showing roughly 30
 10 cfs inflow from the Arkansas River. That's the high
 11 chloride water. The red line is the seepage from
 12 the equus beds from the aquifer draining into the
 13 Little Ark River, and at that 250,000 acre foot
 14 storage deficit there's probably, you know,
 15 somewhere around 10 cfs seepage, which is
 16 essentially the base flow. You know, at
 17 predevelopment, it -- this model shows it to be
 18 right at 40 cfs. So as we fill it up, as we start
 19 recharging or restoring that storage deficit, we'll
 20 be increasing the base flow of the Little Ark River
 21 approximately like this line shows, and we'll be
 22 decreasing the migration of salt -- salt
 23 contamination or chloride contamination coming from
 24 the Ark River.
 25 That's a brief summary of how we have used the

1 simply metered, that is metered in and is modeled as
 2 artificial recharge as well recharge into the model.
 3 Regulations call for an estimate for evaporation and
 4 transpiration. We proposed to lump those together
 5 as previously discussed in the model as a trans --
 6 as a value of transfer -- evapotranspiration. That
 7 is again based on the calibrated -- calibrations for
 8 the Nathan Meyers model and continued into the Burns
 9 McDonald model. Again, it's based on a value that's
 10 reduced with the depth of water below the ground
 11 surface to an extinction point. The -- it also
 12 calls for estimates from an accounting of
 13 infiltration from streams and groundwater discharge
 14 to streams. There's several factors on how -- how
 15 much is infiltrated or exfiltrated, including the
 16 permeability of the river bottom and the
 17 relationship of the groundwater table to the river
 18 level, so the driving head -- and the differences
 19 between the two is a driving head between -- that
 20 impacts the amount of water leaving or entering the
 21 river, and then the calculated recharge credits.
 22 Again, you want to look at a water balance, and a
 23 water balance is essentially water coming into the
 24 system equals the water going out of the system plus
 25 or minus changes in storage, is the basic

1 model in the -- design and feasibility of the
 2 project.
 3 Q Mr. Stous, the regulation 5-12-22 calls for an
 4 annual accounting of water in the basin storage area
 5 to determine the amount of recharge credits held,
 6 and it gives a list of factors to be considered.
 7 Can you tell how the modeling process will be used
 8 to address each of those factors.
 9 A Yes, sir. The regulation calls for a water balance,
 10 which the model is quite capable of doing. The
 11 model -- a basic MODFLOW model will -- the output
 12 will have a water balance for the entire model, the
 13 inflows versus the outflows, and it gives a percent
 14 error if there is a difference. Now, you also can
 15 tell MODFLOW to look at the water balance from each
 16 cell, and that's -- and we'll be using that --
 17 excuse me. We'll be using that in our accounting
 18 process. The regulations call for addressing the
 19 natural and artificial recharge. The model as I've
 20 shown in the conceptual -- conceptually and
 21 described does address the natural precipitation
 22 through -- on an annual basis by the average precip
 23 from the three stations, and then that's distributed
 24 across the model depending on soil types, and that
 25 was calibrated on USGS. The artificial recharge is

1 conservation of mass equation for hydrology. And
 2 we're going to be evaluating all these different
 3 impacts to what makes the change in storage to help
 4 determine the calculated recharge credits. The --
 5 one of the main features of the model that helps
 6 with the calculations is that we can simply, from
 7 two points, calculate the amount of groundwater flow
 8 from one area to another area with the basic Darcy
 9 equation of -- depending on the permeability of
 10 material, the gradient and the distance, but
 11 there's -- there's such variation and such a wide
 12 area that manual calculations are not very
 13 practical, and the model does help us with the --
 14 keep track of all these calculations of movement of
 15 water from one cell to another cell. And we put
 16 together a partial demonstration of how this
 17 might -- we might work this, and if you advance the
 18 slides several -- it's -- you know, another one.
 19 One more. Okay. This is a blowup of the -- the big
 20 squares are the index cells that are -- that are
 21 four -- four square miles to the containment of each
 22 cell, and because the model is oriented parallel to
 23 the Ark River, the model grid does not necessarily
 24 line up parallel with the -- with the index well
 25 grid. Inside -- these cells in here represent the

1 model grid. And we're proposing to use an
2 additional USGS model. It's a post processing model
3 called zone budget, which keeps track of the water
4 budget within a specified area. So we've specified
5 the cells that would be within an index cell and
6 used zone budget to track what water enters from
7 this cell to -- the cell of interest, what water
8 leaves from this cell to this cell and this cell to
9 this cell, and it has a thorough accounting of all
10 the parameters of the water budget.

11 One more slide, please. This is an example of
12 the output of zone budget set up for one cell. It
13 has all the water parameters that flow into the
14 cell. We're looking at say zone two, which is the
15 zone budget terminology, we'll call that index cell
16 two. So this is flow for some time period water in.
17 There's a storage value. There's water that flows
18 from the model's constant head. We do not see it in
19 this particular zone. There is a number for wells.
20 So this is a recharge well that is putting water
21 into the model, so we can see the water coming in.
22 This is the value of recharge from natural
23 precipitation for this example. This is the amount
24 of evapotranspiration for this particular cell.
25 This is the amount of stream leakage in, and there's

1 a summary of the water flowing in versus water
2 flowing out, and then the calculation of the percent
3 of discrepancy. So this is -- we've set this up for
4 each of the index -- 38 index cell areas. It would
5 put out a budget example like -- as you see, for
6 each cell, and then we have one additional problem
7 to have to deal with. If you go back one -- I'm
8 sorry. Another one.

9 This is just a demonstration exhibit. The --
10 there is a gradient from east to west, and -- I'm
11 sorry. West to east. Getting dry. And the model
12 calculates -- you calculate the flow from each of
13 these cells. This will represent a cell, for
14 example, the index cells that we have. And we
15 have -- the lower line here might represent water
16 levels without recharge, so there is a gradient from
17 west to east. And the model will calculate the flow
18 from one cell to the other based on the gradient,
19 the permeability of the materials, the distance, and
20 this flow -- how large an area is contributing to
21 flow, the cross-sectional area between the different
22 cells. So that will give us one value. And as we
23 do recharge, that's going to change as we add water
24 to this cell, that's going to change the flow of
25 characteristics. We have a steeper gradient so this

1 no streams in this particular cell, so there's no
2 water coming in, and then this is the underflow
3 setup for the index cell. All those cells that make
4 up the -- all the model cells that make up the index
5 cell are grouped, and so from zone zero to zone two
6 this much comes in, and similarly for all these
7 different zones, we can see what's coming in to this
8 cell, cell number two, and this is the outflow. It
9 shows a number for storage, and in MODFLOW, in model
10 terminology this gets a little confusing. The
11 store -- the water going, as it's reported here, out
12 of storage, or out to storage, is a better way of
13 thinking of it, is water that's moving out of the
14 flow equation and into storage, so it gets very
15 confusing. This is water moving out of the flow
16 equation and into aquifer storage. Again, there's
17 no water leaving with constant heads. There's a
18 certain amount of water leaving with well pumpage.
19 Of course there's no water leaving with natural
20 recharge. That's just churning through the -- the
21 way the model is. There's some water leaving with
22 ET. There's no water -- because there's no stream
23 in this particular cell, there's no water leaving
24 from -- to a stream. And then this is outflow from
25 cell two to the surrounding cells. And then there's

1 flow increases. In other words, if we put 100
2 credits in here, after some period of time, a
3 certain amount of those credits will move from this
4 cell to this cell. And, therefore, we can't take
5 100 credits back out of this particular cell. We
6 have to track where these credits might go. Now,
7 MODFLOW can't keep track of specific water
8 particles, as such. It can't keep track of red
9 water or blue water or recharge credits and
10 nonrecharge credits specifically internally, so we
11 have to come up with a technique to be able to do
12 that. And the way we will do that is to run MODFLOW
13 twice. We actually run it with all the other stress
14 parameters without -- without the ASR recharge, and
15 then we'll run it with ASR recharge, then compare
16 the flow characteristics, the flow from one cell to
17 the other cell, between the two, and that's
18 attributable to the recharge. And I have -- I know
19 the forms will be -- that this will be reported on
20 be prescribed by the chief engineer. I have just a
21 brief example. Go several ahead, please. What that
22 might look like. For a certain year you have index
23 cell numbers listed, and this is abbreviated just
24 for clarity on the slide, and for this example,
25 index cell one, two, three. Here we have the

1 previous credits from -- credits from the previous
 2 year. In year one, it's zero. And then we have ASR
 3 water in, going in to the spreadsheet, if you will,
 4 and that's simply just metered water in, with so
 5 many -- with so much volume going into the various
 6 cells. Then we'll take out whatever is metered
 7 coming out, and then we have to adjust for
 8 underflow -- the net underflow due to the recharge.
 9 This is not the total underflow, this is just the
 10 net underflow, the net difference between the no
 11 recharge and recharge. So this value will be just
 12 attributed -- this flow from flow out of cell one
 13 will be attributed only to -- to the recharge
 14 project, and that will be negative or positive.
 15 Within that there will be an adjustment also for
 16 evapotranspiration, the amount of evapotranspiration
 17 due only to the recharge project. And then we've
 18 summed those plus or minuses with what's -- well,
 19 the previous year metered in, metered out, and then
 20 what has either come in or lost with underflow and
 21 ET, and that would be our proposed recharge credit
 22 for that particular cell. That will be the sum for
 23 the cell, and then we would propose that that value
 24 or that -- those credits would be attributed to
 25 designated -- just divided and distributed to

1 time.
 2 **A Right.**
 3 Q And what you're doing is measuring everything that
 4 comes into the aquifer from all sorts of different
 5 sources, and what goes out of the aquifer, and what
 6 isn't accounted for otherwise is what's there as a
 7 result of the recharge, is that correct?
 8 **A I didn't follow your question.**
 9 Q Okay. Well, see -- why don't you see if you can
 10 just summarize in a sentence or two for us how the
 11 model is used --
 12 **A Okay.**
 13 Q -- to give the accounting or the water balance
 14 that's necessary.
 15 **A Okay. Great. There's multiple purposes for a**
 16 **model. One, it can predict -- or is used to predict**
 17 **water levels. And the second purpose of the model**
 18 **the way we're using it is to keep track of water**
 19 **budgets within cells, between cells. And we refined**
 20 **the accuracy of those calculations by additional**
 21 **calibration. So the better we calibrate it to water**
 22 **levels, the more we're sure -- or the more positive**
 23 **we are of a good fit or an accurate calculation of**
 24 **the movement of water from one cell to the other.**
 25 **In other words, we're more sure of the water budget**

1 designated recovery wells within that particular
 2 cell. We would -- I realize this is pretty
 3 complicated. We would provide -- we would
 4 anticipate that the reporting of this not only would
 5 be a form similar to this, but it would include all
 6 of the index accounting summaries, each of the
 7 individual water balances, the -- the metered
 8 values, the well pumpage that's obtained from the
 9 water use reports from GMD or DWR, the precipitation
 10 calculations, the river flow calculations, the
 11 detailed zone budget for each of the index cells,
 12 plus this summary, and then also a calibration
 13 summary each year. As the water levels rise it may
 14 be in a portion of the aquifer that may have more
 15 storage or less storage, and so water levels may
 16 rise or not rise quite as fast as we expect. And if
 17 the calibration is off, that provides more data for
 18 us to fine tune the model in greater detail.
 19 Q Mr. Stous, I want to ask a question for myself, and
 20 maybe other people will be interested, too. This
 21 model, then, is a -- it's a predictive tool that's
 22 based on -- it uses numerical formulas based on
 23 measurements, is that right?
 24 **A Yes.**
 25 Q Very detailed ones. And then you define them over

1 that the model is telling us.
 2 Q One of the issues defined in the prehearing order is
 3 whether the water accounting system and model to be
 4 used by Wichita is adequate to determine the
 5 quantity of water recharged and the quantity of
 6 water available for use by Wichita at a later time.
 7 Is the model and accounting system you described
 8 adequate to that end?
 9 **A Yes.**
 10 Q And can you briefly tell us how you know it has that
 11 level of accuracy?
 12 **A Well, through the calibration process, the closeness**
 13 **of it with the measured and predicted water levels**
 14 **is one method. The model has -- the water budgets**
 15 **have been reported as very low discrepancy, so**
 16 **that's a good sign that the model is more accurately**
 17 **predicting what the flow from one cell to another**
 18 **cell is.**
 19 Q All right. Issue number eight of the prehearing
 20 order asks whether the modifications that are
 21 contained in the applications of the city and in the
 22 new application to appropriate water necessitate
 23 changes to the city's groundwater and accounting
 24 model. Are you familiar, first of all, with the
 25 changes described in the new applications and the

1 modifications of those other applications?
 2 **A Generally, yes.**
 3 Q Is the model and the accounting system you described
 4 adequate to address the changes and modifications
 5 and the additional application?
 6 **A Yes.**
 7 MR. HINKLE: Mr. Pope, I have no further
 8 questions.
 9 CROSS-EXAMINATION
 10 BY MR. ADRIAN:
 11 Q I'd like to start with the -- yes, with that exhibit
 12 that's on the screen, which is I gather just a
 13 sample or a for instance --
 14 **A A for instance, yes.**
 15 Q Yes, that you gave us. My question really is in the
 16 second to the right-hand column where I think it
 17 showed a negative 178.9.
 18 **A Yes, in that example.**
 19 Q Yeah. Where did that go?
 20 **A That is water that's moving out of cell two.**
 21 Q By what you call the underflow?
 22 **A By the underflow.**
 23 Q It's just being lost.
 24 **A It's moving from one cell to another cell.**
 25 Q So --

1 **A It's not being lost.**
 2 Q So it really reduces the amount of recharge credit
 3 that the city would have as to that cell.
 4 **A As to that cell.**
 5 Q But it may be added to another cell someplace --
 6 **A That's correct.**
 7 Q -- is what you're saying.
 8 **A That's correct.**
 9 Q When we refer to an accounting system, I normally
 10 think of audit, and in what I'm hearing you say in
 11 regard to testing the accuracy of this accounting
 12 system there is no real way to audit it. Is that
 13 fair to say? What I'm hearing you say, if I could
 14 summarize it a little differently, what I'm hearing
 15 you say is because this model is accurate where we
 16 can check it against reality, then we can presume
 17 that it's accurate on these measures. Is that a
 18 fair statement?
 19 **A I believe so, if I understand your question.**
 20 Q Also -- and now I'm referring to -- well, it's
 21 figure 3-9. It's the gains to and losses from the
 22 equus beds aquifer. That's the crossing red and
 23 blue lines. Yes.
 24 Did I hear in prior testimony that our deficit
 25 now is roughly 283?

1 **A I believe the deficit now is less than 200, but I**
 2 **think at the time of the 1993 period, I believe it's**
 3 **in the neighborhood of 250.**
 4 Q So, now, by -- as a result of reduced pumping,
 5 reduced usage, it's being -- in effect, it's lower
 6 than the 200 is what you're saying.
 7 **A It's less than 200, is my recollection.**
 8 Q And I gather you feel, probably with great
 9 justification, that the model with regard to the
 10 movement of the salt plumes has given us a fairly
 11 accurate prediction of what can happen without some
 12 intervention of some kind.
 13 **A Yes. Based on the other report, on the USGS and**
 14 **Bureau of Reclamation reports, I feel that that's**
 15 **correct, yes.**
 16 Q And that intervention can be either recharge or it
 17 can be reduced usage.
 18 **A Yes.**
 19 MR. ADRIAN: Just a moment. No other
 20 questions.
 21 HEARING OFFICER POPE: Any redirect,
 22 Mr. Hinkle?
 23 MR. HINKLE: Thank you, no redirect.
 24 HEARING OFFICER POPE: Mr. Rolfs?
 25 MR. ROLFS: I don't believe I have any

1 questions.
 2 HEARING OFFICER POPE: Mr. Bagley?
 3 MR. BAGLEY: No.
 4 EXAMINATION
 5 BY HEARING OFFICER POPE:
 6 Q Just a brief one, Mr. Stous, from me. Mr. Adrian
 7 asked you about the use of the model I believe in
 8 terms of sort of assumed accuracy based on the model
 9 itself. Is there not a way to further validate the
 10 model if you compare water levels that are actual
 11 measurements in the index cells in the index wells
 12 compared to what the model would actually predict,
 13 however, in terms of what's in storage in any given
 14 cell?
 15 **A Yes, sir, that's trying to -- I guess that is**
 16 **possible. We did compare the model with actual**
 17 **index well measurements for 19 -- I mean, sorry,**
 18 **2002. We had I think about a four foot -- I forget**
 19 **the exact number -- absolute mean difference. We**
 20 **have not yet calibrated the model with the index**
 21 **well geology. That's -- we're awaiting**
 22 **authorization to do that pending the permits, then**
 23 **we'll continue to calibrate and refine the model to**
 24 **try to narrow that difference between predicted and**
 25 **actual measured water levels.**

1 Q So you will be able to compare predicted versus
 2 actual. But what that doesn't tell you in an
 3 absolute sense is how much of that change in water
 4 level is credits versus just water in storage?
 5 A **No, I think by using the comparative method, by**
 6 **using the nonrecharge and then compare that with the**
 7 **recharge values, we can determine how much of the**
 8 **credits move from one cell to the next cell.**
 9 Q Okay.
 10 A **It's a post processing of both of those data that**
 11 **goes into a database to summarize the total amount**
 12 **out of one cell, total amount in the next cell.**
 13 Q You would agree that having actual measurements of
 14 water levels and measured recharge and measured
 15 pumping are critical to being able to assess this
 16 process.
 17 A **Definitely. Yes, definitely.**
 18 HEARING OFFICER POPE: Okay. Thank you.
 19 Mr. Hinkle, where are you in terms of your witness
 20 list?
 21 MR. HINKLE: Mr. Pope, I have no further
 22 witnesses. As I requested earlier this morning, I'd
 23 like to hold the conclusion of our case pending the
 24 testimony of Mr. Dealy. I also need to move for
 25 admission of all of the exhibits that the city has

1 KANSAS DEPARTMENT OF AGRICULTURE
 2 DIVISION OF WATER RESOURCES
 3
 4 RE: CITY OF WICHITA'S APPLICATIONS TO APPROPRIATE WATER
 5 TO OPERATE AN AQUIFER STORAGE AND RECOVERY PROJECT
 6 IN HARVEY COUNTY, KANSAS
 7
 8 VOLUME II
 9
 10
 11 TRANSCRIPT OF PROCEEDINGS
 12 Transcript of public hearing held at the
 13 Kansas Cosmosphere and Space Center, 1100 Plum Street,
 14 Hutchinson, Kansas, commencing at 8:00 a.m., on Tuesday,
 15 December 21, 2004, heard before the Hearing Officer,
 16 David L. Pope, Chief Engineer, James O. Bagley and
 17 Leland E. Rolfs, Kansas Department of Agriculture,
 18 reported by Michelle D. Hancock, Certified Shorthand
 19 Reporter within and for the state of Kansas.
 20
 21
 22
 23
 24
 25

1 presented either in this hearing or in the
 2 prehearing production.
 3 HEARING OFFICER POPE: Mr. Adrian?
 4 MR. ADRIAN: I have no objection.
 5 HEARING OFFICER POPE: Okay. Without
 6 objection, those exhibits will be admitted. I think
 7 the record will be sufficiently clear without having
 8 to enumerate those at this point, so thank you.
 9 Mr. Adrian, are you ready to proceed, then, at
 10 this point?
 11 MR. ADRIAN: I am ready or --
 12 HEARING OFFICER POPE: Do we need a brief
 13 break?
 14 MR. ADRIAN: Let's take a brief break, if
 15 that would be all right.
 16 HEARING OFFICER POPE: Why don't we do a
 17 brief break. We're going to -- I don't know --
 18 we'll see how this goes. I think there's some
 19 people that hopefully we can -- maybe we can get
 20 through this and we'll just see how that goes.
 21 About 10 minutes. Thank you.
 22 (There was a recess from 4:33 p.m.
 23 to 4:41 p.m. Further proceedings
 24 contained in Volume II.)
 25

1 HEARING OFFICER POPE: We're going to
 2 reconvene. Let me provide one reminder for those in
 3 the audience. As I indicated earlier this morning,
 4 maybe perhaps some of you came in after those
 5 opening comments, but we do have scheduled a public
 6 comment hearing -- portion of the hearing for this
 7 evening at 7:00 p.m. If there are those of you that
 8 would like to make comments at that time and have
 9 not signed up at the desk with Steve over here,
 10 raise your hand. You can do that at any point. At
 11 this point we only have two people that have signed
 12 up to make statements this evening, but if there are
 13 those of you that would like to do that and have not
 14 done so, please let him know and we'll try to
 15 accommodate that. That will help us determine our
 16 schedule in terms of whether we reconvene after that
 17 or whether we -- you know, how we do this, so thank
 18 you very much for that.
 19 With that, Mr. Adrian, I will ask you to call
 20 your first witness.
 21 MR. ADRIAN: Before I do, I want to offer
 22 into evidence the three principal items that we had
 23 submitted much earlier, which are the
 24 recommendations of the district that have obviously
 25 been supplied to all parties, the recommendation and

1 report of Carl Nuzman, which likewise has been
2 supplied to all parties, and then the memorandum of
3 understanding with its attachment A. I'm doing
4 that -- those have all been available to all parties
5 for some time.

6 In addition to that -- I think those should be
7 identified as District Exhibits 1, 2 and 3, and then
8 I would suggest the admission also of Exhibit 4
9 which is the response that we filed this morning
10 with you to the motion to modify.

11 HEARING OFFICER POPE: I believe those
12 documents are well known perhaps to all the parties.

13 MR. HINKLE: Certainly. No objection.

14 HEARING OFFICER POPE: I'm not so sure
15 that some of these may already be in some of the
16 other -- are these all found in, for example, the
17 DWR -- the last item I know would not be, but --
18 we'll identify these separately, because these are
19 documents we want to make sure that there's no
20 question about what's being referred to.

21 MR. ADRIAN: I would prefer that if you
22 would.

23 HEARING OFFICER POPE: Let's identify
24 though four as 1, 2, 3 and 4 as you identified
25 those, Mr. Adrian -- Mr. -- yes, Mr. Adrian, and

1 Q Would you state your name, address and current
2 employment.

3 A **Michael T. Dealy. I'm employed with Equus Beds
4 Groundwater Management District at 313 Spruce
5 Street, Halstead, Kansas.**

6 Q How long have you held that position?

7 A **I've served as manager since May of 1984.**

8 Q What training do you have that you utilize in
9 fulfilling those work requirements?

10 A **I received degrees in -- from Wichita State
11 University in 1976, bachelor of science degree from
12 Fort Hays State University in 1979. I began my
13 career in groundwater management as a staff
14 hydrologist for Groundwater Management District
15 Number 3 in Garden City, Kansas and before taking
16 the post here in 1984 as manager.**

17 Q During those -- the years in that position with the
18 Groundwater Management District have you had an
19 occasion to examine and evaluate applications to
20 appropriate water?

21 A **Yes, I have. My groundwater management experience
22 includes work with individual groundwater users and
23 permit holders, cooperative groundwater studies and
24 regulatory efforts with state and federal agencies.
25 I've been active in developing new groundwater**

1 then we can deal with them later in regard to their
2 admission.

3 MR. ADRIAN: Very good.

4 HEARING OFFICER POPE: Unless there's --

5 MR. ADRIAN: I understood there was no
6 objection.

7 HEARING OFFICER POPE: If there's no
8 objection to those --

9 MR. HINKLE: That's right.

10 HEARING OFFICER POPE: -- we'll just go
11 ahead and admit those and then we'll have that taken
12 care of.

13 MR. ADRIAN: Very good. Thank you.

14 HEARING OFFICER POPE: Those four will be
15 admitted.

16 MR. ADRIAN: And I call Mike Dealy. And
17 with your permission we've moved the podium over
18 near be the projector so that his remote control
19 that isn't so remote will operate the projector.
20 We're ready.

21 MICHAEL T. DEALY,
22 called as a witness, having been first duly
23 sworn, testified as follows:

24 DIRECT EXAMINATION

25 BY MR. ADRIAN:

1 **protection, remediation, reclamation and recharge
2 initiatives with local, state and federal agencies.
3 And specifically my specialties include aquifer
4 storage and recovery, delineation of well and
5 protection areas and groundwater remediation of oil
6 field brine. In addition to that I've authored and
7 coauthored several reports on the Ogallala equus
8 beds in the Dakota aquifer.**

9 Q During the testimony previously given this morning
10 and this afternoon there was reference made with
11 some frequency to contacts with the Groundwater
12 Management District, referring to District Number 2.
13 When that would occur by the city or their
14 consultants, was that contact primarily with you and
15 then secondarily with your staff?

16 A **Mostly on occasion we would work with city staff or
17 their consultants. There also was contact by city
18 staff with the board of directors when there were
19 policy issues to be discussed and agreed to.**

20 Q In your capacity as manager of the district, have
21 you had an occasion to examine the applications that
22 have been filed by the city of Wichita and which are
23 the subject matter of this hearing today, those
24 delineated on the slide projector on the north wall
25 here, have you had occasion to examine those?

1 A Yes, I have.

2 Q And as a result of that examination, have you made

3 recommendations that were initially shown to the

4 board of directors of the district and then

5 eventually to the chief engineer?

6 A That's correct.

7 Q And are you prepared today to provide to those

8 assembled here your analysis of those applications

9 and your recommendations?

10 A That is correct. The modifications that were made

11 to the four applications that we received with the

12 city of Wichita's motion to modify, reapplication

13 and then the introduction of a new application

14 converting a recharge basin to a recharge well.

15 Q Could you describe for us the process simply in

16 steps now that were taken once you received the

17 initial applications which I think were in the

18 spring of this year.

19 A The initial 10 applications we received basically

20 were provided to the district staff hydrologist and

21 we went through -- excuse me -- the staff

22 hydrologist went through to develop the list of

23 concerns, issues, and items that needed to be

24 discussed with myself. After that, a list of

25 background data -- excuse me -- background data was

1 prepared, and nearby data assets that we had were

2 also included into the mix in the review of those

3 applications. From that a list of conditions that

4 we felt were necessary in order to meet the concerns

5 of the staff as well as the board of directors.

6 Q When was that presented to the board of directors?

7 A The board of directors basically was presented that

8 information at a public meeting held in Wichita

9 earlier this year, I believe it was in October or

10 November.

11 Q There was a public hearing held in Wichita I think

12 that was earlier than that, was it not? I think

13 that was in July.

14 A I could defer to that.

15 Q All right. Sometime.

16 A Exactly. It had to be in July because we basically

17 sent in our recommendations to the chief engineer

18 about August 14th, so I do correct that. It was

19 probably in July.

20 Q The recommendations that you made were later

21 modified by a Memorandum of Understanding and an

22 attachment A that was a matter of -- results of a

23 meeting between the district, the district

24 consultant, you, and representatives of the city.

25 Was it not modified in that way?

1 A That is correct. There were some modifications made

2 to the district recommendations that were included

3 in attachment A of the memorandum of understanding

4 between the district and the city.

5 Q Then with the permission of the hearing officer I'd

6 like to invite you to proceed with a description of

7 your analysis of those applications much in the same

8 manner as was done rather than using questions and

9 answers.

10 HEARING OFFICER POPE: That would be

11 fine.

12 A Thank you. In looking at the upper storage and

13 recharge area, we need to basically kind of look at

14 the position of it in relationship to South Central

15 Kansas, and you can see basically that the areas

16 within the four county area of Harvey, Sedgwick,

17 Reno and McPherson Counties. Our district

18 boundaries are shown by the solid blue line. Of

19 interest is the Burrton intensive groundwater use

20 control area that is located to the west of the

21 recharge -- or the recharge -- or aquifer storage

22 and recharge facility, and then another area, a

23 special water quality use area, to the north there

24 covers parts of three counties; and both of those

25 areas were developed by the district and the chief

1 engineer due to oil field brine contamination that

2 occurred beginning back in the 1930s through the

3 1960s. The Little Ark River is located as is shown

4 there, and then we have the seven bank storage wells

5 that are located approximately where the black

6 square is located along the Little Ark River. And

7 then the four aquifer storage and recovery wells are

8 located as shown there with the oval circle.

9 We're going to window in on this area and take

10 a closer look. Looking at the bank storage wells,

11 we're going to window in on this area. Before I do,

12 let me go back and kind of give a brief description

13 of this area. You can see the bank storage wells

14 there shown by the black dots, and then there is a

15 proposed transmission line shown by the green line,

16 and then there are the aquifer storage and recovery

17 wells, the initial wells that were filed and were

18 included in our August 14th review. And the red

19 line is the eastern extent of the Burrton intensive

20 groundwater use control area, and the yellow

21 square -- excuse me -- yellow cross that you see

22 there located along the Little Ark River

23 approximately right there we'll be referring to as

24 the U.S. 50 Halstead gage that is installed and

25 operated by the U.S. Geological Survey. The blue

1 triangles that you see there are nondomestic wells
2 or base flow nodes, and then we have a series of
3 monitoring wells throughout the area that have been
4 established by the district.

5 Windowing on the bank storage area, you can
6 see the initial wells, the seven bank storage wells
7 that were filed with the initial set of
8 applications. They're numbered DW1 through DW7.
9 You can see the associated permit application
10 numbers associated with each of the bank storage
11 wells. In addition to that, the domestic wells that
12 we are aware of based on our knowledge of the area
13 are shown with the black square around them, and
14 then any monitoring well assets that are in the area
15 are shown with the whatever -- red circle and label.
16 There are two in the area, EB143, to the upper left,
17 and then down at the lower left is IW3. The city of
18 Wichita is proposing to basically take advantage of
19 the relationship of the Little Ark River to the
20 equus beds aquifer and use available water through a
21 natural phenomenon called bank storage. In general,
22 most of the time the relationship of equus beds
23 aquifer to the river is that of a base flow
24 condition. In other words, the aquifer is
25 discharging to the river, and the reason for that is

1 that the aquifer's water table is above the bottom
2 of the river channel and, therefore, you're going to
3 get discharge into the river as shown by this
4 generalized cross-section of the river. When we get
5 a condition known as above base flow stage, as shown
6 there by the yellow arrow, and above the base flow
7 stage shown by the white dashed line, we begin to
8 achieve what's called bank storage. And bank
9 storage is defined, as we've heard earlier, by
10 K.A.R. 5-1-1(i), and I won't go over that, but
11 essentially, in laymen's terms, what you have a
12 reversal of the flow grade. It's the river is now
13 pushing water out into the banks and into the
14 aquifer, and it's going to be temporarily stored
15 there as long as we continue to maintain that head
16 difference in the river as opposed to the aquifer.
17 And as the river flow gets greater and the river
18 flow gets longer in duration, you're going to see
19 bank storage begin to develop and move outwardly
20 away from the river.

21 At that point the city of Wichita wants to
22 take advantage of this phenomena and basically put
23 in seven bank storage wells at that site, have them
24 operated at times when we get that above base flow
25 stage condition.

1 In essence, the hydraulic connection from the
2 stream bed and banks through each bank storage well
3 must be significant -- sufficient to transmit bank
4 storage water from the bed and banks of the stream
5 to each bank storage well at a rate sufficient to
6 sustain the authorized rate of diversion for the
7 well. And that's important because we certainly
8 don't want those wells pumping ground water that is
9 not classified as bank storage water. So that's
10 going to be one of the critical questions that we
11 have.

12 This slide illustrates the bank storage well
13 at the Halstead demonstration site. If you look in
14 the upper right-hand corner, where it's kind of dark
15 back there, that would be the proximity of where the
16 river is. So you can see that that bank storage
17 well is very close to the Little Ark River, and
18 that's the key to siting these bank storage wells.

19 August 12th -- and I apologize, I said
20 August 14th, but it's August 12th of '04 the
21 district submitted recommendations to the chief
22 engineer. Those seven applications for the bank
23 storage wells were recommended for approval subject
24 to specific conditions that were listed in our
25 recommendation to the chief engineer, and the

1 provision of the district in the city's Memorandum
2 of Understanding.

3 And I'll go through these in general, but
4 basically all bank storage wells must be equipped
5 with a water meter, they must be within 300 feet of
6 the Little Arkansas River channel, the maximum
7 diversion rate for each well be limited to 1,000
8 gallons a minute, and the wells cannot operate when
9 the river is at base flow, and that's an important
10 fact about this whole project, the one that makes it
11 unique nationwide. The city must establish a
12 groundwater monitoring network at the site. That's
13 another important item that needs to be done,
14 because without this site data, it's going to be
15 hard to answer those questions that the public as
16 well as the regulatory agencies have about the bank
17 storage diversion sites. The city must conduct
18 aquifer tests to determine each well's capture zone.
19 Another important fact and condition that was made
20 part of our recommendation to the chief engineer.
21 The water level monitoring shall have a frequency
22 not to exceed six hours, so we're going to get a
23 very close detailed look at what the water level
24 conditions are doing there throughout that bank
25 storage area. This is another important fact to

1 make sure that we're able to address the questions
2 that the public have about this as well as the
3 regulatory agencies have.

4 Water quality data shall include chemical,
5 biological, physical and radiological data. We're
6 covering all aspects of quality for that water. The
7 well shall be constructed to divert bank storage
8 water. That's important, because we don't want it
9 diverting from ground water from the equus beds.
10 Wells cannot divert water from the lower zone if not
11 hydraulically connected. That's another critical
12 fact that we need to determine through these aquifer
13 pump tests. And diverted bank storage well must
14 meet KDHE -- excuse me -- the diverted bank storage
15 well must meet KDHE recharge standards to put the
16 water back into the aquifer. And then the city must
17 report to the district or the chief engineer monthly
18 for the first year. So we're going to get to me
19 really detailed data in on the first year of
20 operation there, and that's going to answer a lot of
21 the questions that we have and also the public has.

22 On or about November 2nd of this year the city
23 of Wichita filed a modification motion with the
24 chief engineer requesting the locations of the
25 proposed points of diversion for applications 45,569

1 What I wanted to show you here is the bank
2 storage events that occurred during that period of
3 time, and that can be quantified by the data being
4 collected by that transducer from that well.
5 Furthermore, we can go up to the Alta Mills stream
6 gage that is installed and operated by the U.S.
7 Geological Survey and then compare basically the
8 water levels between the flow in the river at the
9 Alta Mills stream gage, which would be north of
10 RDB143, and then look at the water levels there in
11 EB143. And if you notice, the correlation between
12 the bumps there or the rise in the water levels,
13 between when the river flows and the rises in the
14 EB143 well. What this is showing is that there is a
15 hydraulic connection between those two entities, the
16 river and EB143. Again, this data can be used --
17 this method can be used also to quantify the bank
18 storage site that the city is planning to put in.
19 This is very basic data but very critical to
20 answering a lot of our questions.

21 Also with the applications the city has
22 supplied us with lithologic logs. As you see there,
23 the cross-section runs from A to A prime, and we'll
24 show you that cross-section showing the lithologic,
25 the generalized lithologic logs for those bank

1 and 45,572 are moved to improve the quality of bank
2 storage water diverted by the two bank storage
3 wells. I believe there was an issue about the
4 arsenic concentrations that we'll get into here in
5 just a little bit. The two north sites, as you can
6 see there and highlighted by the proposed well
7 locations basically are along the western side of
8 section A, more described as being probably in the
9 west side of the northwest quarter of that section.

10 Let me go back here real quick and point this
11 out, I pointed it out previously, but all things
12 being equal, if you look up to the upper left-hand
13 corner, you'll see EB143. That's one of data assets
14 for collecting not only water quality but water
15 levels. This next slide basically shows you the
16 hydrograph for that well between August of 2003 and
17 July of 2004. And the line that you see there
18 basically is not really a line, they're actual
19 points that were taken by a water level transducer
20 sensor that was put in that well and installed. I
21 believe the -- the period for collecting the water
22 levels was set in the transducer to every four or
23 four to six hours of data. So really those are
24 points that you see of water level measurements
25 there instead of a line.

1 storage wells.

2 The initial locations at the south end of the
3 cross-section are shown there by the end two logs,
4 and then the new locations are shown with the
5 respective application numbers. Now, this is a
6 generalized lithologic log. We went in and took a
7 look at some basic factors: The top soil and the
8 clay and the sand and the shale. Now, the clay
9 basically is going to consist of clay, sandy clay,
10 silty clay, clay silt, but in general, it's not
11 going to have -- it's going to have a lower
12 permeability and transmissivity than the sand unit,
13 and the sand unit can be anything from fine sand,
14 medium sand or coarse sand.

15 We're going to overlay the general location of
16 the stream channel of the Little Ark there shown by
17 the green line, and then we'll overlay the general
18 location, approximate location of the water table
19 for the equus beds aquifer. Basically what we're
20 finding there is that the subsurface geology and the
21 area hydrology are the same when you compare the
22 southern two locations -- the southern locations to
23 the northern locations at those sites.

24 The city had in their modification motion had
25 basically advised that they were doing this because

1 of the arsenic concentration or concentrations in
 2 the southern end. The data that is showing up
 3 there, the arsenic shown with the blue flag is for
 4 the upper zone of the aquifer, and then the red flag
 5 denotes the arsenic concentration in the lower zone
 6 of the aquifer there at index well number three.
 7 The city has supplied us with arsenic concentrations
 8 for those two southern wells, DW1 and DW2, and there
 9 are the concentrations of arsenic in parts per
 10 billion.

11 As we move on up to the new locations, you can
 12 see that concentrations compared to that site
 13 lowered to 8.4 parts per billion, and then when you
 14 move up to the DW9 site they're 6.7. Now, the red
 15 flag indicates this is in the lower zone of the
 16 aquifer. Blue flags indicate that they're in the
 17 upper zone. We didn't get any data about the
 18 quality of the arsenic in the upper zones. We did
 19 grab a sample of water last month from EB143 and had
 20 it analyzed for arsenic concentrations by a state
 21 certified lab here in Kansas, a lab certified with
 22 the Kansas Department of Health and Environment.
 23 RDB143 is completed in what we would determine in
 24 the upper zone or about 59 feet total depth.
 25 Arsenic concentrations there were less than one part

1 per billion.
 2 Another fact that you can consider in this
 3 move is that moving those two bank storage wells to
 4 the north also increases the spacing between the
 5 domestic wells as represented by the black squares
 6 that you see there and the arrows are pointing to.
 7 In general, we find that the move is going to
 8 increase spacing to domestic wells, improve the
 9 quality of diverted bank storage water in the lower
 10 zone when you are considering the arsenic levels.
 11 The proposed locations are in the same section. The
 12 move is subject to the August 12th approval
 13 conditions and also to the MOU provisions, and that
 14 we would also have to reconfigure the monitoring
 15 network for the bank storage site.
 16 And this next slide basically will show you
 17 what we are proposing here. The circles with the --
 18 the blue circles that we are showing there are the
 19 proposed monitoring well sites for the upper and
 20 lower zones that you see there. What we tried to do
 21 is also hook up and form a cross-section with EB103
 22 all the way kind of tilting from southwest to
 23 northeast to get a good cross-section there, and
 24 then we wanted to put some wells along the back side
 25 or on the east side of the river to determine

1 groundwater conditions and water levels there and
 2 water quality. What we're proposing to do is
 3 basically move that well in the southeast corner
 4 essentially up to the northwest corner, and then
 5 move the well that you -- is down there located by
 6 those domestic wells, move that up basically just
 7 south of the river and just near DW9. Again, we're
 8 going to form actually now two cross-sections that
 9 we can get going from IW3 north, straight north, and
 10 then IW3 over to the -- from the southwest to the
 11 northeast, still keeping three monitoring wells on
 12 the east side of the river to determine quality
 13 conditions and levels there.

14 The district board of directors recommended to
 15 the chief engineer that the applications 45,569 and
 16 45,572 be approved subject to the conditions of the
 17 Memorandum of Understanding and to the following
 18 conditions, and basically that the location of the
 19 proposed point of diversion for the application
 20 45,569 be approved at this location as described
 21 there, and then the location for 45,572 as described
 22 there, we'd move those to the north end of their
 23 bank storage line of wells. That the wells must be
 24 positioned within 300 feet of the center line of the
 25 Little Ark River, and that each bank storage well

1 shall have a maximum pumping rate not to exceed
 2 1,000 gallons per minute and that each bank storage
 3 well be equipped with a water meter pursuant to
 4 district regulations, and that the operation of the
 5 bank storage well shall not impair existing water
 6 rights nor prejudicially affect the public interest.
 7 That the bank storage wells diversion -- that the
 8 bank storage water diverted by the bank storage well
 9 shall comply with the source water regulation
 10 5-1-1(sss), and the aquifer's draw-down limit in any
 11 zone, upper or lower, will not exceed 10 feet at a
 12 distance of 660 feet from any bank storage well on
 13 either side of the Little Ark River, and that the
 14 bank storage wells basically comply with K.A.R.
 15 5-22-17(a)(2) and they also comply with
 16 5-22-17(a)(3).
 17 The stream flow data collected from the U.S.
 18 geological stream gage number 07143672 located along
 19 the Little Arkansas River at Highway 50 near
 20 Halstead, Kansas shall be used to determine stream
 21 flow conditions and shall be adjusted for
 22 intervening base flow nodes and existing surface
 23 water rights to determine the operation of the bank
 24 storage well. What we're saying here, that that
 25 gage is located south of the bank storage well site,

1 and that between that gage and the north end of that
 2 bank storage facility, we have intervening base flow
 3 nodes that that discharge needs to be accounted for,
 4 and then there are some existing surface water users
 5 that need to be accounted for when we determine when
 6 base flow is -- base flow occurs, and then when
 7 above base flow conditions occur. A bank storage
 8 well shall operate only during a bank storage event
 9 in the Little Arkansas River as determined by
 10 measured river flow and evidence correlating to
 11 increase of river stage to the increase of the water
 12 level in the bank storage wells or the adjacent
 13 monitoring wells. And that's part of that basic
 14 data that I just showed you with EB143 and the
 15 Little Ark River.

16 A bank storage well shall not be operated
 17 during base flow conditions. And for the purpose of
 18 the permit condition, base flow is defined as flows
 19 in the Little Arkansas River equal to or less than
 20 20 cubic feet per second during the months of
 21 October 1 through March 31st, and equal to or less
 22 than 57 cubic feet per second during the months of
 23 April 1 through September 30th.

24 The operation of a bank storage well shall be
 25 limited to and subject to measured stream flow equal

1 to 75 cfs plus the authorized rate of each bank
 2 storage well from April 1 to September 30th, and 20
 3 cfs plus the additional authorized rate of each bank
 4 storage well from October 1 to March 31st. This
 5 will allow the wells to be staggered in. Because
 6 if -- once we reach say bank -- above base flow
 7 conditions, maybe the conditions are such that if
 8 you turn all seven wells on it's going to drop the
 9 stream flow below this 57 or 20 cubic feet per
 10 second and deplete the stream. This condition right
 11 here will allow each well to be started only when it
 12 satisfies those flow conditions, plus its own
 13 diversion rate.

14 The applicant shall conduct an aquifer pump
 15 test to determine the bank storage well's capture
 16 zone, the hydraulic connection between aquifer's
 17 upper and lower zones at the bank storage wells, and
 18 submit said data and test results to the Division of
 19 Water Resources and the district within a specific
 20 time period.

21 No water shall be pumped from the lower unit
 22 of the aquifer by any bank storage well if
 23 determined by the Division of Water Resources and
 24 the district that a hydraulic connection does not
 25 exist between the aquifer's upper and lower zones.

1 Based on the findings and conclusions of the
 2 Division of Water Resources and the district, a bank
 3 storage well shall be constructed to allow only
 4 withdrawal of bank storage water.

5 A groundwater monitoring network shall be
 6 completed at the bank storage site as shown on
 7 attachment A and shall include existing monitoring
 8 wells IW03, EB143 and EB144. Monitoring wells in
 9 the network are drilled and completed at depths
 10 correlating to the upper and lower zones of the
 11 aquifer for water sample collection, water level
 12 measurements and testing purposes, and to establish
 13 baseline ambient groundwater quality prior to bank
 14 storage withdrawal. Water quality analysis should
 15 be completed at the applicant's expense for samples
 16 collected from domestic wells located within
 17 one-quarter mile of a bank storage well, the
 18 proposed bank storage well, then all monitoring
 19 wells located at the bank storage diversion site.

20 The quality of surface water induced by bank
 21 storage well into the banks of the Little Ark River
 22 shall not degrade the ambient groundwater quality in
 23 the bank storage withdrawal area. And storage water
 24 shall meet or exceed the minimum drinking water
 25 standards specified by the Kansas Department of

1 Health and Environment for artificial recharge. The
 2 applicant shall submit a water level and water
 3 quality monitoring plan for review and comment by
 4 the district and approval by the chief engineer,
 5 Division of Water Resources. The monitoring of the
 6 quality of the source water shall include necessary
 7 chemical, physical, radiological and biological data
 8 and include continuous monitoring of but not limited
 9 to specific conductants, pH, turbidity, dissolved
 10 oxygen and temperature. Water level monitoring at
 11 the bank storage site shall be automated with a
 12 frequency not to exceed six hours. The applicant
 13 shall submit a water field operation monitoring and
 14 reporting plan for review and comment by the
 15 district and approval by the chief engineer of the
 16 Division of Water Resources, and the operational
 17 plan shall include utilization of monitoring wells
 18 and the stream flow monitoring gage in an automated
 19 system.

20 Bank storage diversion quantities, aquifer
 21 injection quantities, water level data, and water
 22 quality analysis shall be reported to the chief
 23 engineer and the district as follows: Each month
 24 for the first year of operation, each calendar
 25 quarter for the second year of operation, and by

1 March 1 each year thereafter.

2 Looking at the aquifer storage and recovery

3 well applications 45,567, 45,568, and 45,576, August

4 12th of this year the district submitted a

5 recommendation to the chief engineer, the three

6 applications were recommended for approval subject

7 to specific conditions and the provisions of the

8 district and city's MOU. On or about November 2nd

9 of this year the city of Wichita filed a

10 modification motion with the chief engineer

11 requesting the location of that proposed point of

12 diversion for application 45,567 was moved about

13 200 feet north of the proposed point of diversion

14 for site access. The proposed location does not

15 comply with well spacing regulation. It is about

16 1,120 feet from an existing irrigation well

17 authorized by permit 41,812.

18 Kind of give you the big picture or view here,

19 we're looking at the aquifer storage and recovery

20 wells in this area. Windowing in on that area, we

21 find the black squares represent the aquifer storage

22 and recovery wells filed by those three

23 applications. This is a typical example of a

24 construction design for a recharge and recovery

25 well. The injection side of the well is shown by

1 those tubes located along the side -- sides of the

2 casing of the ASR well and shown by the blue line

3 there. The withdrawal side is shown by the blue

4 arrow there that connects to the pump column of your

5 pump there and your turbine down in the well casing.

6 The ASR well -- and this is data that we

7 collected and received during the Halstead recharge

8 demonstration project -- the ASR well is located

9 right there in that little tiny black dot shown by

10 that blue flag there. During the operations this

11 slide shows you that there was about a five-foot

12 hydraulic head between the recharge well and about

13 four to 500 feet radius from that well, so you can

14 see the mounding effect that was taking place and

15 can be quantified by the monitoring wells that were

16 installed as part of this demonstration project and

17 are shown on the figure there by the black dots.

18 Here's a picture of the demonstration recharge

19 well. Again, you can see the discharge pipe there

20 that goes down into the well, and then you can see

21 the three injection tubes or piping there on each

22 side around the sides of the cement post there.

23 The three applications that were filed and we

24 commented on, recommendations back in August of this

25 year, are shown there. The one ASR well that needs

1 to be moved is highlighted by the green flag, and

2 this is the initial ASR well location shown by the

3 black square. The applicant proposes to move it

4 across the road about 200 feet. At that point we

5 come into a well placing regulation issue with an

6 irrigation permit 41,812 shown there with the blue

7 flag and the blue triangle. This slide gives you

8 kind of an overall view of the area that they're

9 putting the three ASR wells in. The red dots

10 represent the oil field activities from the records

11 of the Kansas Corporation Commission. As you can

12 see, they tend to get denser as you get west of that

13 area. Also we've outlined -- we identified oil

14 field brine plumes within the Burrton control area

15 and the Burrton control area is shown by the red

16 line there.

17 We've calibrated these oil field brine plumes

18 that we've identified. This is the upper plume in

19 green, and then we've also put in the three recharge

20 basins that will complete phase one for the city's

21 recharge facilities there. The yellow is shown with

22 the middle plume, the oil field brine contamination

23 in the middle zone of the aquifer, and then the red

24 one is the oil field brine plume in the lower

25 portion of the aquifer.

1 The idea is for the city of Wichita to develop

2 a hydraulic head along that line to basically to

3 slow up and retard the movement of the oil field

4 brine into -- further to the east and to the

5 southeast. And the reason for -- that is the reason

6 for lining up those ASR wells and recharge basins in

7 that configuration.

8 You notice up here, I'm pointing out the black

9 dots here, are the seven bank storage wells that

10 basically connect to a pipeline and come down

11 through here. Although I don't show it, it's my

12 understanding there will be a pipeline that extends

13 on down to the southernmost recharge basin. Our

14 original April 12th recommendation developed a

15 monitoring plan as shown here. We proposed that

16 there be a monitoring well located at a radius away

17 from the ASR well. The first set of wells would be

18 330 feet north, east, south and west, and then from

19 there we would step off and set in another line of

20 wells 660 feet behind the 330 foot wells. In

21 addition to that, we were also going to include the

22 IW5 site location which is going to be about over --

23 a little over maybe a quarter to a half mile to the

24 west of that location.

25 We'll need to adjust that slightly, and

1 basically what I think it's going to amount to is
2 moving everything 200 feet north along the
3 north-south access. The east-west access wells
4 probably can remain the same, but there will have to
5 be a slight adjustment for the proposed site
6 monitoring network for the ASR well.

7 Recommendations that the district board made
8 to the chief engineer on this application 45,567 and
9 the proposed move, they recommended that it be
10 approved subject to the Memorandum of Understanding
11 and to the following conditions, and that it be
12 moved to the point that is in the southwest
13 southwest southwest of Section 24, 23, 2 west near a
14 point 105 feet north and 5,195 feet west of the
15 southeast corner of said section. That any future
16 application to change the point of diversion for
17 that ASR well shall comply with the minimum well
18 space requirements set forth in the well spacing
19 regulation.

20 That except for normal well maintenance
21 requirements, back flushing, diversion of water from
22 the ASR well shall not be permitted from June 1 to
23 September 30th of each calendar year. That was put
24 in there by the board to ensure that there won't be
25 any direct impairment from that ASR well if it

1 starts up and pumps withdrawal water during the
2 irrigation season from June 1 to September 30th.

3 The bank storage area shall be defined in
4 compliance with the regulation 5-1-1(k), specifying
5 the portion of the aquifer's unsaturated zone used
6 for aquifer that has defined horizontal boundaries
7 and is delimited by the highest and lowest index
8 water level elevation. That a monitoring well
9 network is established using the Kansas Geological
10 Survey methodology to determine index water levels
11 in each water budget accounting unit. I'll just
12 refer to this and to the subdivision unit from here
13 on out, and the monitoring water levels for water
14 balance calculations and determination of recharge
15 credits.

16 As determined by the Kansas Geological Survey
17 the basin storage area is divided into 38 water
18 budget subunits, and each unit is assigned an index
19 number as shown on attachment B. That the
20 monitoring of the hydrologic conditions in the basin
21 storage area shall include water levels, water
22 quality, water use, water storage, water recovery,
23 precipitation, basic data access and operational
24 reports. That index water levels are established in
25 compliance with K.A.R. 5-1-1(oo) to designate water

1 level evaluations, especially throughout the basin
2 storage area and to determine the maximum volume of
3 basin storage area, the storage available for
4 recovery based on authorized accounting methodology
5 and approved conditions of the permit. This slide
6 shows you the basin storage area as identified with
7 the solid black line going around there, and within
8 that basin storage area it has been subdivided into
9 four square mile units, and each one assigned a
10 subunit number, beginning up here in the upper
11 left-hand corner with IW1 and then numbering across
12 to IW3, 4, 5, 6, 7, 8, 9, 10, 11, and so on, down to
13 the last subunit IW38. Basin area is about
14 92,000 -- 92,720 acres in area. Recommendations to
15 the chief engineer on application 45,567 be approved
16 subject to the Memorandum of Understanding and the
17 following conditions: That the KGS bulletin 79,
18 water level data, that that the highest index water
19 level shall be limited to either the predevelopment
20 water table measurement or the computed water level
21 gradient, and a minimum depth of 10 feet below land
22 surface at the point of lowest land surface
23 elevation in that subdivision unit number 5. So
24 what we're saying here is that we're going to go out
25 and find the area of lowest elevation in that

1 subunit, and then we're going to say that that unit,
2 we're looking at 10 feet below that unit to put in
3 the maximum index level for that unit. And then we
4 have to compute what the gradient would be back to
5 the I index well, in this case IW5, and set that as
6 the maximum level, highest level, index level. The
7 lowest index level shall be determined by the rule
8 and regulation 5-12-1(b)(2) and the highest level
9 based on the conditions in paragraph 9 shall be set
10 at 1,425 feet above mean sea level, and that's based
11 on predevelopment water level for index well number
12 5, as determined by the data in KGS survey bulletin
13 79. Water level monitoring data from index well 5
14 shall be used to compute the water budgets and
15 determine recharge credits. The total volume of the
16 basin storage area shall be calculated in acre feet
17 utilizing the established highest and lowest index
18 levels for each water budget accounting unit, and,
19 B, the area of the basin storage area, and, C, the
20 storage coefficient of the aquifer in each
21 accounting unit.

22 The water balance to determine change in the
23 basin storage area shall be calculated where total
24 inflow minus total outflow equals a change in
25 groundwater storage, and that inflow data utilized

1 in the water balance calculation shall include
 2 natural recharge, groundwater and stream inflow,
 3 artificial recharge, and any other source of water
 4 deemed inflow by the district or by the Division of
 5 Water Resources. Passive recharge shall not be
 6 considered as inflow and shall be excluded from any
 7 water balance calculations. The outflow data
 8 utilized in the water balance calculations shall
 9 include evapotranspiration, base flow, groundwater
 10 and stream outflow, nondomestic water use, and again
 11 any other source of water deemed outflow by the
 12 district or the Division of Water Resources.

13 The proposed recovery of water artificially
 14 recharged by the operator of the aquifer storage and
 15 recovery system shall only occur when recharge
 16 credits are determined to be available for that
 17 index site or subbasin. To determine recharge
 18 credits for the proposed ASR applications, and that
 19 means all three of them, shall be computed through
 20 water balance methodology utilizing index data from
 21 water budget accounting or water subunits 1 through
 22 10 and that credit for passive recharge shall be
 23 prohibited.

24 A monitoring well network is installed at the
 25 applicant's expense to monitor the ASR well and

1 water quality standards for affluent are approved by
 2 the department for organic and inorganic compounds,
 3 pesticides and bacteria, and that water recharged to
 4 the aquifer through the ASR well shall comply with
 5 source water regulation 5-1-1(s).

6 Water recharged to the aquifer shall either
 7 comply with U.S. EPA protection -- excuse me -- U.S.
 8 EPA and KDHE safe drinking water standards or meet
 9 the ambient water quality at the recharge site,
 10 whichever is better, as determined by the Secretary
 11 of the Kansas Department of Health and Environment.
 12 The quality of recharged water injected into the
 13 aquifer through the ASR well shall not degrade the
 14 ambient groundwater quality in the basin storage
 15 area. To establish that baseline, groundwater
 16 quality prior to bank storage withdrawal or an ASR
 17 injection, water quality analysis shall be completed
 18 at the applicant's expense for samples collected
 19 from domestic wells located within one-quarter mile
 20 of the ASR well, the ASR well and all monitoring
 21 wells located at the ASR sites. The recharge system
 22 is constructed, operated and monitored to prevent
 23 groundwater contamination, and the city shall
 24 provide to the district a final report containing a
 25 description and scale map of the as-built aquifer

1 shall include existing monitoring well site IW05.
 2 Monitoring wells are drilled and completed at depths
 3 correlating to the recharge and recovery zone of the
 4 aquifer for water sample collection, water level
 5 measurements and testing purposes. Monitoring well
 6 sites are completed at spacing distance of 330 feet
 7 and 660 feet north, south, east and west of the ASR
 8 well. The water level monitoring of the ASR well
 9 should be automated with a frequency not to exceed
 10 six hours. Before installation of ASR well, the
 11 applicant shall submit a water level and water
 12 quality monitoring plan to the district for review
 13 and comment and to the chief engineer for approval.

14 That water quality monitoring plan shall
 15 include all necessary chemical, physical,
 16 radiological and biological data and include
 17 continuous monitoring of but not limited to specific
 18 conductance, pH, turbidities, dissolved oxygen and
 19 temperature. The proposed ASR well is equipped with
 20 water meters to separately and accurately record the
 21 total flow of water injected and diverted from the
 22 ASR well and that the water meter installation shall
 23 comply with district regulations. The use of the
 24 ASR well is authorized by the Department of Health
 25 and Environment as a class 5 UIC well, and minimum

1 storage and recovery system, the diversion
 2 quantities, aquifer injection qualities, water level
 3 data, water quality analysis shall be reported to
 4 the chief engineer and the district each month for
 5 the first year, each calendar quarter for the second
 6 year, and by March 1 of each year thereafter. The
 7 operation of the proposed well shall not impair
 8 existing water rights or prejudicially affect the
 9 public interest, and when it is determined by the
 10 chief engineer that impairment of an existing prior
 11 right was caused by the ASR well the city agrees to
 12 either regulate the ASR well's diversion to secure
 13 water to satisfy the needs of a prior right or any
 14 other requirement as specified by the chief
 15 engineer.

16 In regards to the city's motion to add a
 17 aquifer storage and recovery well under application
 18 46,081. That on or about November 2 the city did
 19 file that motion to convert a recharge basin to an
 20 aquifer storage and recovery well in the city's
 21 aquifer storage and recovery system. The applicant
 22 proposes to treat recharge water to the equus beds
 23 aquifer through the well for aquifer storage and
 24 recovery. The applicant has indicated that water
 25 will be diverted from the well for well maintenance

1 purposes only and has requested a maximum quantity
2 of 43 acre feet per year. To give you an idea on
3 the scale map where we are, it's shown by the
4 aquifer storage and recovery wells. I'll window in
5 on that area. These are the existing three wells.
6 Again, flip through these. We've already seen these
7 slides. Basically this is what the city is
8 proposing to put in. These are the three existing
9 wells. When we window out, we can see that they
10 propose to put that fourth well application covered
11 by application 46,081 shown there by the blue
12 square, and the salt water plume is shown giving you
13 the location of that application to the salt water
14 plume located to the west. And, again, the idea is
15 to develop a hydraulic head to manage to reduce and
16 retard -- excuse me -- to retard the flow of the
17 salt water plumes migrating from the west to the
18 east-southeast.

19 Recommendations to the chief engineer.

20 HEARING OFFICER POPE: Mr. Dealy, let me
21 interrupt for just one second, if we could here.

22 A Sure.

23 HEARING OFFICER POPE: In looking at our
24 time schedule, I'm -- if you can just hold for a
25 minute. I would -- let me -- I'm not trying to rush

1 case, if you have any key comments that you want to
2 continue, I think I was sort of thinking perhaps if
3 that was concluded, that would be -- if we could get
4 to the end of your direct examination here rather
5 quickly, if that would be okay with counsel, and
6 then at that point we can talk about where we go
7 from there in terms of a break and how we proceed in
8 terms of schedule, and why don't we finish that up
9 and then go at that point.

10 MR. ADRIAN: Remain there just a moment.

11 Q These recommendations that you have submitted on
12 behalf of the board are similar to the
13 recommendations that are contained in the report to
14 the board that you made in the spring of the year, I
15 believe, or in the summer, regarding the other --
16 all the other applications, are they not? In other
17 words, there's nothing particularly surprising in
18 these recommendations.

19 A That's correct.

20 Q So they are also, as you correctly noted, subject to
21 the Memorandum of Understanding between the district
22 and the city and the attachment A to that.

23 A That is correct.

24 Q So we would -- you would submit that along with the
25 information contained in your -- in your slides,

1 what you're doing, I'm just thinking in terms of the
2 evening session and in terms of our schedule. Can
3 you give me an estimate of how much longer your
4 direct testimony would be?

5 A I would say another three to five minutes, or if you
6 want I can just basically -- the recommendations
7 that I'm about to go through are listed in the
8 response the district had to you, they're going to
9 be similar to the conditions that were set up for
10 the other two ASR wells, and certainly it's going to
11 be redundant to go through these.

12 HEARING OFFICER POPE: Well, if --

13 A But I'd be happy to if you would like.

14 HEARING OFFICER POPE: Mr. Adrian, I
15 don't want to tell you how to operate in terms of
16 your witness here.

17 MR. ADRIAN: I would be content just
18 submitting the written review that you have given to
19 the chief engineer today. Again, it is redundant
20 over one of the -- over the rest of your
21 recommendations, is it not?

22 A That's correct.

23 MR. ADRIAN: Yeah, so we could just
24 submit that.

25 HEARING OFFICER POPE: If that's the

1 Power Point slides, and I would advise the chief
2 engineer that we do not have hard copies of those,
3 but we have magnetic copies of those available for
4 all parties and the chief engineer. Is there
5 anything else you'd care to add?

6 A I had one more point to make, and in this
7 recommendation there is a difference in that the ASR
8 well that is proposed there is in an index subunit
9 09 instead of 05, so the index sub -- the sub -- the
10 subcell or the subunit would be IW9, and as such
11 we've made recommendations on the maximum highest
12 index level to be 1,420 for that index unit.

13 Q Mr. Dealy, I would also ask you, was written
14 permission sought from the adjoining well owner
15 because of the reduced well spacing on that one
16 application?

17 A On the well owner, permit owner of 41A-1-2 we did
18 receive a fax transmission and then a follow-up
19 letter from that permit owner basically stating that
20 they, as I remember, had no objections to siting
21 that there. I think there was a condition about
22 making sure that an impairment does not occur,
23 but -- I'm paraphrasing it, but, yes, we did receive
24 a written --

25 Q And the adjoining well owner was one in the same as

1 the person who owned the land upon which this new
2 well is to be placed. Is that --

3 **A That's correct.**

4 **Q** And would it be also fair to say that the board
5 considered that maybe interesting and possibly
6 slightly persuasive but didn't use it as a basis to
7 approve this variation?

8 **A That is correct.**

9 **MR. ADRIAN:** I think I have no other
10 questions.

11 **HEARING OFFICER POPE:** Okay. Thank you
12 very much, Mr. Dealy. I appreciate your
13 responsiveness to the issue we just need to work
14 through here in terms of timing. I need to then
15 turn to counsel here. We have about -- it's about a
16 quarter till 6:00, in terms of just from a
17 scheduling standpoint, in terms of where we are, in
18 terms of your additional witnesses, we have a couple
19 of choices. One, we can break now, come back at
20 seven o'clock, or if there are other -- I know you
21 have other witnesses, Mr. Adrian, and I -- I don't
22 know what the schedule is. I understand there may
23 be some time constraints there. What's your
24 preference in terms of how you to proceed?

25 **MR. ADRIAN:** I think my preference would

1 that, but I don't know whether -- how -- whether
2 there's a getting too late sort of an issue in terms
3 of travel or things of that nature. Would you -- if
4 you would rather -- if we could defer on the cross
5 and if we could go ahead with Mr. Nuzman because of
6 his schedule and see where we end up, if that could
7 be done before the seven o'clock, I'm just a little
8 bit concerned that we need to be here for sure at
9 seven o'clock because I know there are going to be
10 members of the public showing up.

11 **MR. ADRIAN:** I'm sure we can do that.

12 **HEARING OFFICER POPE:** Again, I don't
13 want to cause a problem in terms of getting the full
14 benefit of the testimony, but if we want to try that
15 for a while, it's about a quarter till 6:00, we can
16 see how that would go.

17 **MR. ADRIAN:** Now, is that -- let me --

18 **HEARING OFFICER POPE:** Let me ask the
19 city of Wichita. What's your concern and preference
20 here?

21 **MR. HINKLE:** To do Mr. Nuzman now?

22 **HEARING OFFICER POPE:** Yeah. An option
23 would be if we did Mr. Nuzman now and then the --
24 that would free up him in terms of traveling back to
25 his home, which I understand he has some personal

1 be to simply charge ahead, but that doesn't allow
2 anybody to escape to eat anything at the moment.
3 My -- the only time constraint I have is that
4 Mr. Nuzman is not prepared to stay over tonight and
5 so I don't want to compel him to stay to be here in
6 the morning. I would also like to finish today if
7 we could.

8 **HEARING OFFICER POPE:** What's the
9 estimate in terms of the -- if we did push ahead,
10 what would be the estimated time -- let's say if we
11 potentially held on cross-examination for Mr. Dealy,
12 for example, in order to -- I take it there would
13 not be a -- would there be an objection to that?

14 **MR. HINKLE:** To doing Mr. Dealy's cross
15 at a different time?

16 **HEARING OFFICER POPE:** Yes.

17 **MR. HINKLE:** That would be fine.

18 **MR. ADRIAN:** I have two other witnesses
19 and they will be shorter in time, and I would guess
20 at a maximum probably 30 minutes each.

21 **HEARING OFFICER POPE:** And we would have
22 the potential of continuing after the public
23 portion --

24 **MR. ADRIAN:** Right.

25 **HEARING OFFICER POPE:** -- in regard to

1 needs there related to his spouse. The -- in regard
2 to then we would hopefully have at least some time
3 to break, come back for the public comment period,
4 and then we could proceed either yet this evening,
5 depending on how long it is, or of course come back
6 tomorrow is another option.

7 **MR. HINKLE:** Certainly. That's fine.

8 **HEARING OFFICER POPE:** Why don't we go
9 ahead and we'll proceed with Mr. Nuzman.

10 **CARL E. NUZMAN,**
11 called as a witness, having been first duly
12 sworn, testified as follows:

13 **DIRECT EXAMINATION**

14 **BY MR. ADRIAN:**

15 **Q** Would you state your name, current occupation, and
16 address, please.

17 **A Carl E. Nuzman, current occupation, consultant,**
18 **professional engineer/hydrogeologist, and my address**
19 **is 3314 Northwest Huxman Road, Silver Lake, Kansas**
20 **66539.**

21 **Q** All right. Thank you. And would you briefly
22 describe your training, education and experience
23 that qualifies you to be a consulting engineer and
24 hydrologist?

25 **A I'm a graduate engineer from the ag engineering**

1 department, Kansas State University, 1953. I have a
2 master of science in water resources engineering
3 from the University of Kansas, 1966. I started my
4 career in water resources with the Division of Water
5 Resources in 1957. I was there nine years. And one
6 year with the Kansas Water Resources board and did
7 the first quantitative hydrologic study of the
8 Ogallala aquifer. In 1967 I went to work for Lane
9 Western and now Lane Christianson Company. I've
10 done water supply work and groundwater evaluations
11 in some form or another in 37 states and five
12 foreign countries.

13 Q You have been hired, have you not, by the Equus Beds
14 Groundwater Management District as a special
15 consultant in regard to this project?

16 A Yes, I have.

17 Q Have you had an opportunity -- well, how long have
18 you been so employed or contracted?

19 A Approximately one year.

20 Q During that period of time have you had an
21 opportunity to examine much if not at all of the
22 evidence that has been suggested or referred to
23 today in this hearing, more particularly the
24 applications that the city has submitted and other
25 analyses that has been done on those applications?

1 A As others have alluded to, the mass of data on this
2 particular project is so voluminous it would be
3 impossible to examine it all. I have examined as
4 much as possible that was readily available from
5 published reports and other information that was
6 available from the Groundwater Management District.

7 Q You've examined enough of the information and
8 voluminous evidence, though, to prepare a report,
9 have you not, that was submitted to the board and
10 the district?

11 A Yes, I have. And the scope of work was written by
12 your director, which I have followed in my report.

13 Q You participated in, did you not, the public hearing
14 that was held by the district in consideration of
15 these applications last summer?

16 A Yes, I was.

17 Q Then you had an opportunity, did you not, subsequent
18 to that hearing to participate in a meeting with the
19 city of Wichita which ultimately resulted in the
20 Memorandum of Understanding that has been referred
21 to so frequently today.

22 A Yes, I did.

23 Q And you're prepared today, are you not, to go
24 through that Memorandum of Understanding and
25 describe for the hearing officer your

1 recommendations and conclusions with regard to that
2 Memorandum of Understanding.

3 A Yes, I am.

4 Q Well, then, I would just invite you to proceed as
5 Mr. Dealy did in describing -- in going through the
6 slides and describing what your recommendations are.

7 A The first issue in the Memorandum of Understanding
8 was regard to the initial conceptual plan of
9 installing 75 MGD of bank storage facilities and 25
10 MGD of direct surface water diversion. As has been
11 testified by Mr. Warren and Mr. Blain, that that has
12 been revised, and the city is looking at developing
13 at least 60 MGD of direct surface water diversion,
14 and based on the 100,000,000 gallon a day total
15 system, that would leave roughly 40,000,000 gallons
16 a day for bank storage wells and others. One of the
17 concerns that brought that out was in a paragraph
18 that we have is that the river bed infiltration rate
19 of the Little Ark River was not of sufficient
20 capacity to supply the full flow of the test
21 production well directly from the river to the well
22 itself. Part of that was due to the construction of
23 the well, that the well was constructed in the lower
24 aquifer only. It was constructed to municipal water
25 standards normally dictated by the Kansas Department

1 of Health and Environment and the upper aquifer was
2 totally grout sealed and prevented from entering the
3 direct flow of the well. What actually happened in
4 my opinion is that the well did pump water that was
5 recharged from the Little Ark River. There was
6 leakage from the shallow aquifer to the deep
7 aquifer. There was natural recharge that was
8 contributing to the flow of the well. There may
9 have also been boundary flow from the eastern side
10 of the aquifer, flow from Emma Creek and Sand Creek
11 to the east of this well that was influencing the
12 water levels and the quality of water. We know from
13 Mr. Ziegler's testimony that water quality did
14 change in response to some of the leakage from the
15 bed and there was an erosional feature through the
16 shallow aquifer, the confining place, the shallow
17 aquifer, just to the west of this well that allowed
18 direct leakage to come from the base channel of the
19 river, Little Ark River, through the shallow
20 aquifer, go through the breach in the clay that
21 normally separates the two aquifers and come back in
22 in an indirect manner to this well. One of the
23 things that I was concerned about with the
24 installation of the bank storage wells -- and you
25 might note, Mr. Pope, that I chose not to use the

1 word bank storage in my report. I referred to these
 2 as source water recharge wells, and there was a
 3 purpose in that, in that bank storage is a very
 4 interesting concept and that people see a water
 5 level rise in the river, and a mile away maybe, or a
 6 half mile away, they see a water level rise in a
 7 well, and they think that the water traveled
 8 directly from the river to the well, which is
 9 absolutely false. When we have a confined aquifer,
 10 we may have a coefficient of storativity of 10 to
 11 the minus three or something even lower than that,
 12 and we get a pressure wave response from the rise in
 13 water level in the river. That pressure wave
 14 travels at approximately 1,000 feet per minute,
 15 close to the speed of sound, and so you see this
 16 sudden rise of two or three feet, but that doesn't
 17 mean that there's three or four acre feet of water
 18 that is transferred instantaneously from the river
 19 to the aquifer. It's basically a pressure response,
 20 and so the actual physical quantity that moves
 21 sometimes from the bank of the river into the clays
 22 and silts of the bank is a relatively small quantity
 23 of water. It is an important quantity of water, but
 24 it's not really direct infiltration. So bank
 25 storage, in the way that has been used in the past,

1 really encompasses more than just the direct
 2 infiltration of water from the little river.
 3 Q Mr. Nuzman, the slide that is on the screen at the
 4 moment is a portion of your report, is it not?
 5 A It is, and basically giving some of the factors that
 6 I found from experience, and this was one of the
 7 very difficult things to model is to determine
 8 exactly what the infiltration weight in terms of
 9 gallons per day per square foot, and what I've done
 10 is, is I've referred to some of the other tests that
 11 I've accomplished in other states and even in Kansas
 12 where we have made specific effort to determine
 13 exactly what that leakage rate was of the bed of the
 14 stream.
 15 I'd like to move on to issue number two in the
 16 memorandum, and that is for the city's initial plans
 17 for bank storage wells to be screened in the lower
 18 part of the aquifer only because of water quality
 19 and well efficiency concerns.
 20 One of the conditions in the memorandum that
 21 the city will install one shallow test well at one
 22 diversion well site to determine the appropriate
 23 yield water quality and connectivity to the river.
 24 And this carries on the same issue we just
 25 previously discussed in that water quality is a big

1 issue in various things. One of the slides that
 2 Mike has just shown was that the water -- the
 3 arsenic content in the shallow aquifer is
 4 practically absent or very low, where the arsenic in
 5 the lower aquifer can be significant in places. The
 6 exact cause and the exact chemistry and things that
 7 go on to create arsenic in water, we know that
 8 arsenic is a natural constituent of the clays, the
 9 montmorillonite clays, and when we have excessive
 10 drawdown and start dewatering some of these clays,
 11 we find we get subsidence, and we also change the
 12 valence of the clays from an arsenic -- bound up to
 13 an arsenic three or an arsenic five valence, and
 14 become slightly soluble, and we see it coming into
 15 the groundwater as a result of pumping of wells.
 16 At issue in number two, the city has committed
 17 to -- we will test the shallow aquifer in itself,
 18 where it's of some thickness, so we can get some
 19 idea of the permeability and the actual water
 20 quality in that and can we actually get a direct
 21 infiltration. And direct infiltration of flow would
 22 be shown by what was in Mike's comment by pH,
 23 conductivity and temperature, whereas after several
 24 days of pumping you should have the quality of water
 25 in that shallow aquifer mirror roughly, not exactly,

1 but start mirroring the chemical constituents that
 2 you saw in the surface water itself.
 3 In item number three the city will design bank
 4 storage diversion wells screened in the upper
 5 well -- upper aquifer as well as the lower sand
 6 zones. And this is -- the upper zone adversely
 7 affects water quality to an unacceptable amount, the
 8 city may seal it after consultation with the GMD2.
 9 And again this is the same -- same issue and stuff
 10 that -- and we go back to some of the irrigation
 11 well construction. Nearly all the irrigation well
 12 construction in the area in the equus beds typically
 13 screens most of the aquifers. They do not segregate
 14 one. And that's typical of all irrigation well
 15 construction. That also has the advantage of
 16 bringing in water through the gravel pack so that
 17 they get some increase in yield, and it also reduces
 18 some of the differential pressure between the upper
 19 aquifer and the lower aquifer, allowing a passageway
 20 through the clays at that particular zone to help
 21 neutralize the difference in water levels between
 22 the aquifers. And if there is a major problem of
 23 water quality of unacceptable amounts, certainly the
 24 city should be authorized to seal that off.
 25 I'd like to move to issue four. Issue four is

1 deemed appropriate and acceptable to DWR. The city
 2 will agree to establishment of a special condition
 3 on a diversion well appropriation that requires
 4 review by DWR and GMD and all the data collected at
 5 the diversion sites prior to the end of the first
 6 four years of operations. I would like to back up
 7 to three for just a minute.

8 Q I think that one we were just on is incorrectly
 9 listed issue 6. I think it may be issue four.

10 A Yeah, I think it is. Anyway, on issue three, we
 11 want to address the safe yield concept. If we don't
 12 get all the water directly from the little river, as
 13 we know we don't, that I've suggested that there be
 14 a drawdown limit of 10 feet at 660 feet from the
 15 wells, and this would be shown in the monitoring
 16 wells. Where this came from was that I did an
 17 assumption from some of the test data from a test
 18 well at Halstead and developed an estimate of the
 19 transmissivity of the aquifer and developed a
 20 distance drawdown radius of influence curve, and the
 21 radius of influence was -- was approximately
 22 4,000 feet. And if you have multiple wells close
 23 together, less than the 1,320 feet of spacing, that
 24 there would be mutual inference between these wells,
 25 and if the leakage rate from the little river and

1 from the upper aquifer and all the other sources do
 2 not supply sufficient water for the production of
 3 the bank storage wells, then the drawdown would
 4 continue to go on down, and so I did a real quick
 5 calculation by hand, if I had three wells in a line
 6 space of 1,320 feet apart, that the mutual
 7 interference and drawdown should probably be no
 8 greater than about 10 feet at 660 feet, so that's
 9 why we've specified monitoring wells both on the
 10 east side of the Little River and on the west side
 11 of the Little River at approximately 660 feet to
 12 measure that. Now, that distance doesn't have to be
 13 exactly on 660 feet. You can take a distance
 14 drawdown, and it could be 1,200 feet or it could be
 15 500 feet or 700 feet or whatever, and you can work
 16 out the distance drawdown curve for that and adjust
 17 that value accordingly. But, anyway, we tried to
 18 build in -- or my whole point in helping the
 19 district in this is to build in the safeguards in
 20 the monitoring well system which Mike has just
 21 presented to you, and where most of that came from
 22 Mike and myself put together for the safeguard of
 23 the aquifer and of the district.

24 The next issue --

25 Q Mr. Nuzman, I was recalling that on issue number

1 four, you were going to speak -- address verbally
 2 and we didn't have a slide on that one. And you
 3 were not going to address issue five.

4 A Well, issue four is basically the review, and I
 5 basically concur with the review of operations.

6 One of the things in the criterion design of
 7 these wells, since they are not for direct public
 8 water supply purposes -- and Dave Waldo is in the
 9 audience here -- that they do not have to be
 10 constructed to municipal standards. Am I correct on
 11 that or not?

12 (Audience member responded out of
 13 the hearing of the reporter.)

14 THE REPORTER: I'm sorry?

15 A We were wondering whether these wells had to be
 16 constructed exactly to municipal standards or not
 17 for the source water recharge wells since it's going
 18 to be recharged to the aquifer. Minimum standards
 19 require 20 feet of grout seal from the surface of
 20 ground to the top of the well, and that should be
 21 complied with. The question I had is, is whether I
 22 can screen the upper aquifer.

23 MR. ADRIAN: We'll have to let him
 24 address that, at some later time, though.

25 A But anyway, the whole point is that we need to

1 consider as much of the aquifer as possible in that
 2 situation.

3 I'd like to move to issue five is the
 4 financial assistance and issue six deals with the
 5 evaluation, the design and placement of the recharge
 6 wells and facilities near Burrton, and I would like
 7 to address the recharge facilities at this time.

8 In my report, I went through and evaluated the
 9 cone of impression, and the cone of impression of a
 10 recharge well is very similar to the cone of
 11 depression, and theoretically it's a mirror image.
 12 And the spacing of the recharge wells at one mile
 13 spacing approximately to form the hydraulic barrier
 14 does not give any overlap or very little overlap
 15 between the wells to perform a groundwater mound
 16 that would inhibit or completely hold the plume at
 17 that area.

18 In other states such as California where
 19 they've had a salt water intrusion barrier for quite
 20 some time they have found that they can maintain
 21 that hydraulic barrier with injection wells fairly
 22 closely spaced and salvage nearly 90 percent of that
 23 water for public water supply or for other uses,
 24 whatever that use might be. I have proposed in my
 25 report a specific location of the hydraulic barrier

1 based on half-mile spacing, and the wells would be a
2 little bit west of the proposed line that the
3 consultants have. And it's not that the present
4 line of wells, recharge wells, would not be
5 effective, because they will do some good, but it's
6 a question of whether they would actually halt the
7 physical movement of water, and in this phase one of
8 this project, it is really recommended that the
9 chief engineer approve it and go ahead and with our
10 monitoring programs that we put in place to measure
11 the results of that and then do a reevaluation in a
12 few years to see what modifications, if any, need to
13 be made to proceed with the project.

14 Q Mr. Nuzman, if I could interrupt must a moment.
15 Mike, would you flip ahead two slides. This is
16 somewhat hazy, but this would reveal what you had
17 suggested in your report, isn't that correct?

18 A That's right.

19 Q You were proposing that the well sites be more
20 frequently inserted and moved to the west
21 approximately a half a mile from the proposed
22 locations?

23 A And some of the sites addressed -- like the
24 northernmost ones was in the shallow aquifer only,
25 since there wasn't any pollution in the deeper

1 aquifers at that location, and so their effective
2 recharge rate might be only like two or 300 gallons
3 a minute as opposed to 1,000 or more that they're
4 proposing at the source water recharge -- the
5 recharge wells at the present time. And so I
6 basically was looking at the various aquifers, the
7 depth of them, and having these particular hydraulic
8 barrier wells addressing each specific aquifer.

9 Q And to be clear about this to the city and the chief
10 engineer, that was your suggestion when you walked
11 into the meeting that resulted in the Memorandum of
12 Understanding, and you have signed off on the
13 Memorandum of Understanding with the modification
14 that was shown under issue number six, is that
15 correct?

16 A That's correct.

17 Q Okay.

18 A The other issue is that we do have a few areas where
19 we have some extremely high quality pristine water
20 in the equus beds aquifer, some of it in the
21 deepermost and some of it in the other -- spread out
22 through the area. These areas are relatively small,
23 but with sodium and chloride contents of 15 or
24 20 milligrams per liter and less than two parts per
25 million or parts per billion of arsenic and that

1 type of thing, and there was concern expressed by
2 some of the members of the district about injecting
3 water that would degrade the ambient quality that is
4 there. Not that it would degrade the ambient use,
5 if the use is strictly for domestic services, and
6 that recommendation was in the report that Mike made
7 to you just previously in regard to that.

8 In closing, I'd just like to make a comment
9 that there's a unique aspect to this project that
10 has never been done before. I've worked a little
11 bit in Florida and Virginia, where the first
12 recharge and recovery wells were installed, and this
13 project proposes to store water in the aquifer for
14 multiple years before withdrawal. Typically, they
15 have put water in a marginal aquifer or salt water
16 aquifer, fresh water, you have to cycle it five or
17 seven times or 10 times sometimes before you get the
18 chamber built up. You have some special water
19 hydraulics with wells that -- in clay where the pump
20 suction is set and all of this, and then you store
21 it for peak flow demands, and within six months or
22 whatever, you pull the water back out and then pump
23 it back in the distribution system, and then the
24 following fall or off peak time, why, then you
25 inject water back in, and you're just basically

1 using the aquifer for storage, and relatively a
2 short period of time. To store water for several
3 years before its use represents a concept that
4 really hasn't been proven, and I want to commend the
5 consultants and the city of Wichita for the
6 extensive work that they have done, and with the
7 monitoring well system that we've proposed by the
8 district and others, I think we have the framework
9 in place to make this project a success.

10 HEARING OFFICER POPE: You care to
11 cross-examine?

12 MR. HINKLE: I do, but, Mr. Pope, I'd
13 like a couple of moments to confer with my
14 colleagues here before I do so.

15 HEARING OFFICER POPE: Sure.
16 (There was a recess from 6:17 p.m.
17 to 6:20 p.m.)

18 CROSS-EXAMINATION

19 BY MR. HINKLE:

20 Q Mr. Nuzman, I understand both from your comments
21 here at the very end of your presentation and also
22 the question leading into it from Mr. Adrian that
23 you do support the project that has been approved by
24 the district and under the terms of the MOU, is that
25 correct?

1 A That's correct.

2 MR. HINKLE: Thank you, then. I don't
3 have any further questions. Well, I do -- I have
4 one. Should never let a lawyer hold a microphone
5 too long.

6 Q When you do so, you take into account the fact that
7 the plan as proposed is not substantially
8 prejudicial to the public interest, is that right?

9 A That's right.

10 MR. HINKLE: Okay. I guess now I'm
11 really done. Thank you.

12 MR. ADRIAN: I have no redirect. Okay.

13 Oh, I'm sorry. You might have some questions.

14 HEARING OFFICER POPE: I understand there
15 will be no redirect. Mr. Rolfs?

16 MR. ROLFS: I have no questions.

17 HEARING OFFICER POPE: Mr. Bagley?

18 MR. BAGLEY: I don't think so.

19 HEARING OFFICER POPE: I just want to
20 clarify, I think you indicated during your
21 testimony, Mr. Nuzman, that you were fully in
22 support of the proposed operations plan and the
23 four-year review?

24 A Yes. Absolutely. And I think we're going to learn
25 an awful lot and the project needs to go ahead in

1 idea at this point, but if it's not too terribly
2 late, we would just then reconvene the formal part
3 at that point and conclude the cross-examination for
4 Mr. Dealy and Mr. Seiler.

5 MR. HINKLE: That's fine with us.

6 MR. ADRIAN: If that works for
7 Mr. Seiler? Okay. That way we at least have some
8 break at this point in time. I'll afraid we're not
9 going to get done and we may have to go straight
10 through and that may be too much, so with that we're
11 going to go ahead and recess at this time until the
12 public comment period.

13 (There was a recess from 6:23 p.m.
14 to 7:07 p.m.)

15 HEARING OFFICER POPE: Let me call the
16 hearing to order, please. Thank you very much. And
17 any of you that are waiting to get a seat, why,
18 please go ahead and do that.

19 For the record, my name is David Pope, chief
20 engineer and director of the Division of Water
21 Resources, Kansas Department of Agriculture. It's
22 just after 7:00 p.m. on Tuesday, December 21, 2004.
23 We're here at the Kansas Cosmosphere and Space
24 Center at 1100 North Plum Street, Hutchinson,
25 Kansas. This is the portion of the hearing provided

1 its first phase so that we can get some information
2 and data to find out what our problems really are
3 and address those.

4 HEARING OFFICER POPE: All right. Thank
5 you. I have no further questions. Mr. Adrian, I
6 know we have remaining cross-examination for
7 Mr. Dealy and you have, what, one more witness after
8 that? I am wondering, and I'll pose this question
9 to counsel for both parties. At this point I know
10 we only have a couple of people that have signed up
11 for comment but there may very well be a number of
12 people that come in just directly in response to the
13 notice, and I wonder if we shouldn't go ahead and
14 take a break now, come back at seven o'clock, and
15 then I would ask if it would be acceptable to then
16 consider reconvening after the public comment period
17 depending on how long that lasts.

18 Are you accepting to that as a possibility?

19 MR. HINKLE: Yes. The city would
20 certainly be willing to do that.

21 HEARING OFFICER POPE: Mr. Adrian, if --
22 and I know you're conferring with your witness. If
23 we broke now, which would give us almost a half
24 hour, then we could come back after the public
25 comment period, see how long that goes, I have no

1 for public comments on the city of Wichita's
2 proposed aquifer storage and recovery program in
3 Harvey County, Kansas, and this hearing is being
4 held as required by Kansas Administrative Regulation
5 5-12-3. I will make a few brief comments about our
6 purpose this evening. Some of you may have heard
7 parts of this earlier if you were here during the
8 course of the day and others I know have come in
9 just for the evening, and then I will set forth the
10 process that we'll follow this evening. If you have
11 not signed up the attendance -- signed the
12 attendance sheet out at the front door, I would ask
13 you to do that before you leave, or if necessary we
14 can circulate an attendance sheet as well. And if
15 you would like to make oral or written comments we
16 would ask that you fill out a card. That's some
17 three by five cards back there also that would help
18 us get those in the cue here for taking your
19 statements this evening.

20 Now, notice of this public hearing was sent by
21 regular mail to the parties, which in this case are
22 the applicant, the city of Wichita, and the Equus
23 Beds Groundwater Management District Number 2 that
24 have participated earlier today in the formal
25 portion of the hearing, and that will continue here

1 either after we're done this evening or tomorrow.
2 Notice was also provided to water right holders,
3 owners in the area and their water use
4 correspondents of record in the office of the chief
5 engineer in the vicinity of the proposed wells, as
6 well as individuals who had requested be notified of
7 the hearing. Notice was also published in the
8 Hutchinson News and the Wichita Eagle on or about
9 December 10, 2004.

10 Briefly stated, the general purpose of the
11 hearing is to consider whether the city of Wichita's
12 new applications to appropriate water, and those are
13 file numbers 45,567 through 45,576 and 46,081, and
14 whether or not those applications should be
15 approved, denied or modified. The general test for
16 approving new applications is whether or not they
17 will impair a use under an existing water right or
18 prejudicially and unreasonably affect the public
19 interest. Hopefully all of you have heard something
20 about the project or seen the notices, but briefly
21 stated, the series of applications were filed by the
22 city of Wichita under the provisions of the water
23 appropriation act for the purposes of appropriating
24 high flows from the Little Arkansas River by means
25 of seven proposed bank storage wells, proposing to

1 withdraw water along the west bank of the Little
2 Arkansas River in Section 8, Township 23 south,
3 Range 2 west, Harvey, County, Kansas. And generally
4 located in the vicinity of the -- and upstream of
5 the Highway 50 bridge over the river. The water
6 will then be treated and injected into the aquifer
7 by means of four recharge wells, and those are
8 located in sections 12, 23, 24 and 36 in Township 23
9 south, Range 3 west, Harvey County, Kansas,
10 generally along a line east of Burrton, Kansas. And
11 then the water would -- is proposed to be ultimately
12 withdrawn later for municipal use by these recharge
13 wells.

14 Now, the purpose of this public comment period
15 is to receive comments about the proposed project,
16 including these following questions in particular:
17 The method by which surface water will be withdrawn
18 from the Little Arkansas River, the process for
19 treating and recharging it into the equus beds
20 aquifer, the accounting system that the city of
21 Wichita will use to determine how much of the water
22 has been recharged into the aquifer, may be
23 withdrawn, and if the applications are approved, any
24 terms and conditions that will need to be placed on
25 permits to prevent impairment of other water rights

1 and to prevent the project from prejudicially and
2 unreasonably affecting the public interest.

3 You may provide oral or written comments or
4 both, and, again, if you would like to do so, why,
5 please let Steve Bond standing in the door know and
6 he can provide you with a card. I will -- and if
7 you fill one of the cards out and decide later you
8 don't want to testify, why, then you can pass as
9 well.

10 Our testimony during the course of the
11 hearing -- and we've had some extensive testimony
12 here during the course earlier during the formal
13 portion, but as -- in keeping within the nature of
14 the hearing, I will ask that each witness be sworn
15 under oath. As you can see, testimony will be taken
16 by a court reporter this evening, however, there is
17 somewhat of a difference in that you will not be
18 subjected to cross-examination by the attorneys for
19 the parties, however, myself and Mr. Rolfs do
20 reserve the right to ask any clarifying questions.
21 Depending on how many people totally we have before
22 it's over with, we do need to manage our time this
23 evening. I would ask each of you to try to keep
24 your comments to five minutes or less. If there is
25 a special reason to go beyond that, why just me let

1 me know and we'll try to accommodate things if it's
2 a reasonable basis if we can. And I'll ask each of
3 you to come forward one at a time as I call off your
4 names. If people -- I understand some of you do
5 have time constraints, we'll try to honor those as
6 much as we can, if there are special circumstances
7 in terms of other commitments. The -- I would
8 certainly ask that you just speak clearly so the
9 court reporter can record your comments, and we'll
10 try to do this in an organized way.

11 Certainly do want to close by saying
12 appreciate your attendance and your interest in this
13 project. Do want to hear those comments and how you
14 feel about this, whether it's particular concerns or
15 data or support or whatever it may be, but feel free
16 to provide those comments.

17 At this point in time, we do have a series of
18 letters that have already been received, now, some
19 letters were received earlier during the processing
20 of earlier notice regarding these applications.
21 Those, too, are in the record that has already been
22 received earlier today and admitted into evidence,
23 but today we have received letters from several
24 individuals or groups. These include the Wichita
25 Area Builders Association, by M.S. Mitchell, a

1 letter from the Wichita Independent Business
 2 Association, from Mr. Cliff Sones, President. We
 3 have a letter from Mr. Philip H. Alexander, city
 4 attorney for -- is this from Derby?
 5 UNIDENTIFIED SPEAKER: Derby.
 6 HEARING OFFICER POPE: Derby? It's a fax
 7 copy. I don't believe there was any letterhead that
 8 showed up. Also a letter from Mr. G. B. Sam
 9 Serrill, chief operating officer for the Wesley
 10 Medical Center. Have a letter from the city of
 11 Goddard, signed by James A. Singletary, mayor. And
 12 a letter from the Chisholm Creek Utility Authority
 13 by the manager. I believe that's Kenneth W.
 14 Thorton. And then finally a letter from the City of
 15 Colwich signed by the city clerk, Diana K. Brooks.
 16 I believe that completes the list of letters and
 17 documents that have been provided here today during
 18 the course of the hearings either by fax or by hand
 19 copy provided to me. I will not read these
 20 individually, but they are available here to be made
 21 a part of the record, and if people do want to
 22 examine those, they will be here at the table.
 23 Now, at this point I do want to indicate that
 24 I have a series of cards here, and we had two
 25 individuals that had participated earlier during

1 court reporter to swear you in.
 2 MR. NEUWAY: My name is Ronald Neuway. I
 3 live at 903 North Willow Lake Road, Burrton, Kansas.
 4 And first of all --
 5 RONALD NEUWAY,
 6 having been first duly sworn, testified upon his
 7 oath as follows:
 8 MR. NEUWAY: First of all, I'm not a very
 9 good speaker and I suffer from post-traumatic stress
 10 disorder from the time that I served my country in
 11 Korea, so if I do get confused and have to start
 12 over, bear with me. I'll try to do as best as I
 13 can. Starting off, I got my notes out. To begin
 14 with, I'd like to thank Mr. Pope, the Department of
 15 Agriculture, water resource board, Groundwater
 16 Management District Number 2 for all the work that
 17 they've done which has been one tremendous project,
 18 magnitude which is almost second to none. The board
 19 of directors, present and past, I can only give them
 20 my greatest gratitude in all the considerations they
 21 gave this project and all the reading and free time
 22 that they spent on the project.
 23 And as for my comments, thank you for giving
 24 me a chance to express my concerns about the aquifer
 25 storage and recovery project in Harvey County. I do

1 these proceedings as a result of the original notice
 2 of the prehearing conference. Those individuals
 3 asked at that time to make statements. They did not
 4 ask or seek to become formal parties in this
 5 proceeding, but those individuals who may also want
 6 to maybe comments this evening were Joe Bergkamp of
 7 Halstead and Ron Neuway of Burrton, Kansas so I
 8 wanted to acknowledge that, and if they would still
 9 like to make comments, why, we'll accommodate those.
 10 Are they both here this evening? I believe I saw
 11 Mr. Bergkamp. Both of you are here? Okay. Would
 12 you like to make your comments, since you
 13 participated earlier, would you like to go first
 14 this evening or do you care?
 15 MR. NEUWAY: What's that?
 16 HEARING OFFICER POPE: Would you like to
 17 make your comments now and go first or --
 18 MR. NEUWAY: Yeah, I can make them first.
 19 HEARING OFFICER POPE: We'll do that, and
 20 then we'll take these other comments as we go.
 21 Again, if you would, each of you, would state for
 22 the record your full name, your address, who you are
 23 representing if anyone other than yourself, and then
 24 we'll ask you to make your statement, and I will ask
 25 you again after you provide this information for the

1 not believe Wichita has the right to alter or divert
 2 the natural flow of the aquifer. What they propose
 3 is no more than taking water from one end of a tub
 4 and pouring it back into the other end. By doing so
 5 they feel that the water they moved is theirs to be
 6 used at their will. What about the rights of the
 7 water users downstream from this project? If this
 8 water is taken from high flow times, is it fair that
 9 the natural recharge downstream from this aquifer
 10 storage be altered? Water belongs to all people,
 11 not just Wichita. If Wichita has its way, all their
 12 water would come from the aquifer.
 13 At this time Kansas is at odds with Colorado
 14 for diverting water that should have flown into
 15 Kansas. Excuse me. I think those living downstream
 16 from this project feel the same way as their water
 17 is being diverted as well. Myself and others in my
 18 area feel this recharge project is no more than a
 19 shell game so Wichita can take more water to resell
 20 at high rates to Wichita and other surrounding
 21 towns. My quarter section, 14-23-3 west is located
 22 across the road to the southwest from the first
 23 injection well two miles north of Highway 50. I am
 24 totally opposed to any water, treated or nontreated,
 25 to be injected into the aquifer that is my water

1 source. I have drank water from Wichita for 26
2 years, and I find it to be of substandard. My water
3 is pristine and very good drinking quality. If this
4 project is approved, I feel I am entitled to
5 monetary compensation for any changes in the quality
6 of water that is in my aquifer. What they propose
7 by injecting treated water into the aquifer is no
8 different than someone spraying pesticides or
9 herbicides or other chemicals on the surface of my
10 pasture or croplands.

11 I understand Wichita has refused to put up a
12 bond for damages. The board had strongly
13 recommended that this be done at the Groundwater
14 Management District 2 meeting, but no action taken.
15 My land has a large area of designated wetlands that
16 I'm not allowed to drain or alter. The area in and
17 around my land has an underflow problem. When
18 setting posts for a corral three years ago I hit
19 water at two feet and three feet. At times you can
20 drive a tractor and combine on what seems to be like
21 a dry surface, only to have it give way and get
22 stuck into your axles. My land is located in the
23 sand hills thus making the underflow rise and low at
24 a very easy rate. I've been told the aquifer
25 recharge in no way will raise the water table to the

1 underflow. If this is true, how can the water perk
2 along the Arkansas river at a great -- at a rate
3 great enough to be taken out and retransmitted to
4 the recharge wells? Excuse me again.

5 I would like to know how fast the river would
6 recharge the aquifer. At the proposed rate of 50
7 million gallons a day that would be taken from the
8 area and injected into four recharge wells and three
9 basins, I do not see how this can physically be
10 possible. My house has drain tiles around the
11 basement and a lift to remove underflow water at
12 high flow times. I also have a cellar that has a
13 lift pump in it also to keep the water out. If they
14 are concerned about the stopping of the water plume,
15 why don't they take this water plume, treat the
16 water, thus keeping the water flow from moving and
17 possibly recharge that area with good water? Again,
18 my fellow farmers and ranchers, if this project is
19 approved, those of you that are in the recovery site
20 and all the water users downstream will be affected
21 as your natural recharge will not happen as it has
22 in the past. I feel that we are going to be told at
23 some time in the future to shut your wells back and
24 eventually they will tell us to shut them off as
25 Wichita has priority. And that's the end of my

1 statement.

2 You have any questions, I'd like to try to
3 answer them.

4 HEARING OFFICER POPE: Okay. Thank you.
5 Mr. Rolfs, did you have any?

6 MR. ROLFS: No.

7 MR. NEUWAY: Good enough?

8 HEARING OFFICER POPE: Well, I think so.
9 Let me -- you're -- which direction are you located
10 from that closest recharge site?

11 MR. NEUWAY: The closest well, I'm just
12 about -- well, about a quarter of a mile to the
13 south and west of the first recharge well.

14 HEARING OFFICER POPE: Okay.

15 MR. NEUWAY: On the west side.

16 HEARING OFFICER POPE: Okay.

17 MR. NEUWAY: Good enough? Thank you for
18 your time again.

19 HEARING OFFICER POPE: The other
20 individual that had earlier participated was Ron
21 Neuway, I believe it was? Oh, I'm sorry. Joe
22 Bergkamp. I'm sorry. Ron was just here, yeah.

23 MR. BERGKAMP: I'm Joe Bergkamp, and my
24 address is 2004 South Willow Lake Road.

25 JOE BERGKAMP,

1 having been first duly sworn, testified upon his
2 oath as follows:

3 MR. BERGKAMP: I have three concerns I'd
4 like to air tonight. The first one is, any property
5 that the city of Wichita wishes to acquire with
6 permit issued, I'd like to see that property owned
7 before the permits are considered. And the second
8 concern is, the way I understand it, they're talking
9 about running some power lines along Section 25. I
10 live basically three miles east of Burrton in
11 Section 25, the two most southern recharge wells,
12 one at the north and one at the south end of my
13 property, which is a mile, and they're talking about
14 running some power lines along the county road to
15 feed electricity to the wells, and that's going to
16 create havoc with the center pivot that I have. I
17 would like to see the power lines either routed
18 around the section or go underground with their
19 power lines. But the third most concern that I have
20 is what this is going to do to the property that I
21 have that lays between the two recharge wells.

22 The geologists' reports that I've heard is
23 nothing more than a guesstimation. Nobody knows
24 exactly what's going to take place 10, 15, 20
25 years ago from now. Am I going to develop some seep

1 holes on some of the property that I have that no
2 longer can be farmed? We don't know. You know, I
3 probably won't be around to see it, but I'm thinking
4 of the next generation. A lot like the city of
5 Wichita is thinking of their investment, they'd like
6 to protect it. And so that is the third most
7 concern that I have tonight, and I'd like to thank
8 you for the opportunity to allow me to voice my
9 opinion on it. And do you have any questions?

10 HEARING OFFICER POPE: Let me ask Mr.
11 Rolfs first. Do you have any questions?

12 MR. ROLFS: You said this was -- you say
13 this was in Section 25 that you --

14 MR. BERGKAMP: Yeah.

15 MR. ROLFS: -- own? And what township
16 and range is that?

17 MR. BERGKAMP: That's in Burrton
18 Township, and the range is 3 west. And at this
19 point in time, their recharge wells, the two most
20 southern recharge wells, one is at the north end of
21 the property and one is at the south end, so
22 basically, if anything's going to take place, the
23 property that I have is going to be right on the
24 crosshairs. You know, am I going to have trees that
25 are going to start to die, or am I going to have

1 lose a lot of irrigated acres, and then they came
2 back and they said, the city of Wichita, and said,
3 well, we're going to bring the power lines around
4 the section so we won't have any power lines on your
5 property. That's what they had said, and if they
6 follow through with that, then that's great, but I
7 would just like to air my opinion on that, that we
8 get this on record that that is one of my concerns,
9 that they don't go in reverse and say, well, we are
10 going to run power lines now. I just want to get
11 this on record that I don't want any power lines
12 along that Section 25, the westbound line.

13 HEARING OFFICER POPE: Do you have a --
14 thank you. On your third point --

15 MR. BERGKAMP: Uh-huh.

16 HEARING OFFICER POPE: -- you were
17 concerned about what might happen since you have
18 property apparently between two of the recharge
19 wells, if I understand you properly. What's -- can
20 you tell me just briefly a little bit more of the
21 nature of your concerns.

22 MR. BERGKAMP: Uh-huh.

23 HEARING OFFICER POPE: Is it water table?
24 Is it other factors or --

25 MR. BERGKAMP: Basically, when they raise

1 seep holes develop after 10 or 15 years of raising
2 the water table up? Right now it doesn't appear
3 like that, but nobody knows what's going to take
4 place on something like this when the state or when
5 the township or the county comes and says we need so
6 many more feet to widen this road, we know what the
7 outlay is going to be from the get-go, but on
8 something like this, it's hard to forecast what's
9 going to take place.

10 I'd like to see some provisions added that
11 would protect some of the property owners up and
12 down the recharge well sites.

13 HEARING OFFICER POPE: Mr. Bergkamp, let
14 me ask you a follow-up question on the second point.
15 I know one of the issues in the case is related to
16 your first point, so we'll be dealing with that.
17 Your second point was regarding the proposed power
18 lines. Has anything happened so far in regard to --
19 what's your understanding in terms of the route and
20 are those proposed to be located on private
21 property, your property, or --

22 MR. BERGKAMP: From the start they were
23 going to run on my property. And this particular
24 circle that I'm thinking of, it's a Valley corner
25 system, and when you shorten that up, you really

1 that water table up, since this has not been done in
2 the area, nobody can say just exactly what's going
3 to happen. It's nothing more than a guesstimation,
4 so my concern is, once that water table is raised
5 up, are we going to have areas in our fields where
6 it's not going to want to dry out and -- you know,
7 which is obviously because of the water table that
8 was brought up. I have two irrigation wells and
9 then I live there, too, so we have two irrigation
10 wells and a domestic well there, and, you know, we
11 don't know what the outcome is going to be on
12 something like that. We got an educated guess, if
13 you will, and at this point in time that's all we
14 can go with, but I would like to see some type of a
15 provision put in that would cover something that
16 would come up down the road. Thank you.

17 HEARING OFFICER POPE: Thank you very
18 much. I'd like to now call Michael Gurman. Do I
19 have that right?

20 MR. GURMAN: I have a written statement.
21 My name is Mike Gurman. My business address is 3801
22 South Oliver Street, Post Office Box 7730, Wichita,
23 Kansas. I am the director of communications and --
24 I'm sorry.

25 MICHAEL GURMAN,

1 having been first duly sworn, testified upon his
2 oath as follows:

3 MR. GURMAN: I am the director of
4 communications and public affairs for the Boeing
5 Company. I want to thank you, Mr. Pope, for the
6 opportunity to comment at this public hearing this
7 evening. The availability of economical, clean,
8 high quality water is one of the primary needs for
9 community health, development and growth. As one of
10 the manufacturing consumers of water in this area of
11 the state, Boeing is especially aware of the need
12 for reliable, clean water sources and water
13 conservation efforts necessary to protect those
14 sources. The Boeing Company continually strives to
15 utilize energy, water, and other resources in an
16 efficient manner and conserve nonrenewable resources
17 to preserve environmental quality for future
18 generations.

19 In support of water conservation, Boeing
20 implemented water recycling and zero water discharge
21 from our manufacturing operations. Because of these
22 conservation efforts, the Boeing company saves
23 approximately 1.5 million gallons of water per day,
24 or 525 million gallons of water per year. The water
25 saved is now available to help support community

1 requirements. In addition, we are continually
2 identifying and implementing new and improved
3 manufacturing processes that require less water and
4 energy to use.

5 The Boeing Company believes that the project
6 being proposed by the city of Wichita to appropriate
7 high flows from the Little Arkansas River and inject
8 the waters into the equus beds aquifer for storage
9 and future use enhances the responsibility we all
10 have to conserve our natural resources. Boeing
11 believes it is necessary to conceive and develop
12 conservation projects such as this so that coming
13 generations will have the resources necessary for
14 growth and a sustainable future. Thank you.

15 HEARING OFFICER POPE: I don't believe I
16 have any, so thank you very much.

17 MR. GURMAN: Thank you.

18 HEARING OFFICER POPE: Next card I have
19 is from Mr. John F. Weber, I believe it is. Do I
20 have that right? Mr. Weber.

21 UNIDENTIFIED SPEAKER: He's not here.

22 HEARING OFFICER POPE: Okay. Dennis
23 Clennan.

24 DENNIS CLENNAN,
25 having been first duly sworn, testified upon his

1 oath as follows:

2 MR. CLENNAN: My name is Dennis Clennan.
3 I'm the director of public works and engineering for
4 the city of Hutchinson. I appreciate the
5 opportunity to speak here this evening,
6 Mr. Chairman. As a director of public works and
7 engineering I'm responsible for providing safe
8 drinking water for about 40,000 of our customers
9 here in Hutchinson, and I'm here tonight to be in
10 support of the city of Wichita's applications. The
11 city's artificial storage and recovery project will
12 enhance the future water supply of this region;
13 specifically, this project will benefit the public
14 and the environment in the following manner: The
15 artificial recharge of water into the aquifer will
16 restore water levels in the area that has
17 experienced a decline of greater than 30 feet. By
18 raising the water levels, a hydraulic barrier will
19 be created to impede the movement of salt water from
20 the Burrton oil field. By raising the water levels,
21 the movement of salt water contamination from the
22 Arkansas River to the fresh and usable water
23 supplies will be inhibited. Increases in water
24 levels will enhance base flow conditions in the
25 Little Arkansas River, and this project will be

1 intentionally monitored by the city of Wichita and
2 numerous regulating agencies to ensure utilization
3 of only bank storage water and to protect the
4 ambient water quality of the storage area. The
5 equus beds aquifer is extremely important to South
6 Central Kansas. In addition to providing
7 significant economic benefits to agribusiness, it
8 also supplies drinking water for almost 500,000
9 people. The city of Wichita should be commended for
10 taking the financial risks associated with the
11 implementation of this innovative project.

12 Again, the city of Hutchinson supports the
13 city of Wichita's applications to withdraw and store
14 water from the banks of the Little Arkansas River.
15 Thank you.

16 HEARING OFFICER POPE: Thank you. I
17 don't believe I have any. Thank you very much.
18 John Walker, or Walter.

19 JOHN WALTNER,
20 having been first duly sworn, testified on his
21 oath as follows:

22 MR. WALTNER: Good evening. My name is
23 John Waltner. I'm the mayor of the city of Hesston,
24 have been for a number of years, and I must tell you
25 that the city of Hesston has every one of its

1 municipal water wells in the equus beds. We are
 2 keenly interested in water quality and quantity
 3 issues in the equus beds. I'm also here this
 4 evening as the chair of the legislative committee of
 5 the regional economic area partnership, commonly
 6 known as REAP. REAP is a council of local
 7 governments in South Central Kansas. The 31 city
 8 and county governments in REAP have voluntarily
 9 joined together for two primary purposes: First, to
 10 guide state and national actions that effect
 11 economic development in the region; and, second, to
 12 adopt joint actions among member governments that
 13 enhance the regional economy. One of the most
 14 significant regional priorities for REAP is the
 15 protection of the public water supply in South
 16 Central Kansas. The equus beds aquifer is a primary
 17 source of water for many REAP communities and is
 18 clearly critical to the economy of South Central
 19 Kansas. The aquifer storage and recovery project is
 20 a bold initiative and much needed for the long-term
 21 economic viability for this region and for the state
 22 as a whole.

23 The threats to the equus beds are numerous and
 24 have been well documented. If nothing is done to
 25 enhance the quality and quantity of this vital and

1 natural resource, the consequences will be
 2 significant.

3 As proposed, the artificial recharge of water
 4 into the aquifer will restore water levels in the
 5 region that has seen a decline in excess of 30 feet,
 6 and by raising water levels the movement of salt
 7 water from the Burrton oil field will be restrained.
 8 The city of Wichita is a member of REAP and has been
 9 a strong partner with communities and organizations
 10 in this region on the issues of water protection and
 11 supply. The aquifer storage and recovery project is
 12 another example of Wichita's commitment to seeking
 13 new technologies and collaborative methods to
 14 respond to the challenges confronting public water
 15 suppliers and local governments. The city of
 16 Wichita ought be complimented for investing its
 17 resources in this innovative project that has the
 18 potential to address and solve one of the most
 19 critical public policy issues of our time, and I
 20 thank you for your time.

21 HEARING OFFICER POPE: Thank you. Thank
 22 you very much. Mr. Bruce Seiler.

23 BRUCE SEILER,
 24 having been first duly sworn, testified upon
 25 his oath as follows:

1 MR. SEILER: I'm Bruce Seiler. I reside
 2 at 13940 West 93rd Street North, just about
 3 two miles south of Bentley.

4 HEARING OFFICER POPE: You may need to
 5 speak into the microphone a little bit stronger
 6 there.

7 MR. SEILER: I just have a couple of
 8 comments and a few observations. Support the
 9 project in the original plan with the shallow wells
 10 along the river. We have several wells south of
 11 Bentley. Back in the mid '90s we drilled deeper.
 12 Our shallower wells were getting a lot of salt
 13 intrusion from the river. We're right north of the
 14 river. And our 60 and 70 foot wells that we had at
 15 that time were in the 400 to 500 parts per million
 16 sodium, and chloride levels were extremely high. We
 17 couldn't grow soybeans. So we drilled wells down to
 18 a lower shelf, or a lower level, lower vein of
 19 water. Those wells are in the 190 to 205 range, and
 20 our sodium levels went down. One in fact is right
 21 at 100. It used to be at 450, 460. And I just -- I
 22 feel like there's no continuity between the surface
 23 water, the 40, 50 foot level near the river, to the
 24 water that's down at 200 foot.

25 The original plan they were saying 50 and 60

1 foot wells near the river, to pull this water out,
 2 this bank storage. Now they're saying 150 and 200
 3 foot to increase their pumping efficiency. Just --
 4 I have a difficult time believing that that water is
 5 the same water down lower, with our experience there
 6 next to the river on the big river.

7 And one other comment. The northwest Wichita
 8 waste water treatment facility there south and west
 9 of Maize that went online, we was told that it was
 10 going to be discharging somewhere between 3 and
 11 4 million gallons of water a day, and I just wish
 12 that that type water could be sent back north
 13 possibly east of Bentley there where there is a
 14 recharge basin there, one of the prototype basins.
 15 You know, that's water that could be sent back to
 16 recharge with. As time goes on and the northwest
 17 part of the city gets filled in, you know, that --
 18 that amount of water will increase, and, you know,
 19 that's water that could be recharged, sent back.
 20 Appreciate the time.

21 HEARING OFFICER POPE: Hold on just one
 22 second, if you could, there. I just had one
 23 quick --

24 MR. SEILER: Yes.

25 HEARING OFFICER POPE: -- clarification

1 question. I wanted to make sure I understood where
2 you were describing in terms of your location.

3 MR. SEILER: Two miles south of Bentley
4 and three-quarter east is where I live, but we had
5 five wells through there in the mid '90s that we
6 drilled down to the 200 foot level and got into much
7 better quality water.

8 HEARING OFFICER POPE: Okay.

9 MR. SEILER: But I just -- I just feel
10 like the 200 foot wells near the Little River are --
11 it's aquifer water, it's not -- to me it's not bank
12 storage water, and I just have concerns with that.

13 HEARING OFFICER POPE: Okay. I can
14 understand. Thank you.

15 MR. SEILER: Thank you.

16 HEARING OFFICER POPE: Gerald Holman.

17 GERALD HOLMAN,
18 having been first duly sworn, testified upon his
19 oath as follows:

20 MR. HOLMAN: My name is Gerald Holman.
21 Business address is 350 West Douglas in Wichita, and
22 I'm representing the Chamber of Commerce there in
23 Wichita. Thank you for allowing me to speak this
24 evening and the opportunity to be here. The Wichita
25 Area Chamber of Commerce has actively supported the

1 barrier, so environmental protection of the aquifer,
2 which this strategic project provides, has
3 increasing importance to ensure quality water for
4 the future and the quantity needed for the future.
5 The project is a viable component of Wichita's
6 comprehensive and integrated water supply strategy.

7 A demonstration project has confirmed
8 engineering models that the full scale project is
9 feasible. An environmental impact statement has
10 been prepared. The city of Wichita has met or will
11 meet all the conditions established by GMD2. The
12 project is less costly, both environmentally and
13 economically, when compared with other alternatives.
14 So because of the resource needs and the due
15 diligence having been and being completed by the
16 city of Wichita and GMD2, we encourage your approval
17 of this project. So thank you very much.

18 HEARING OFFICER POPE: Thank you. I
19 don't believe I have any questions. Thank you. Bob
20 Nichols.

21 BOB NICHOLS,
22 having been first duly sworn, testified on his
23 oath as follows:

24 HEARING OFFICER POPE: Would you go ahead
25 and add your address in the record.

1 development of this recharge project for many years.
2 We are encouraged that the demonstration project has
3 proven the feasibility of recharging the aquifer
4 which supplies water to more than half a million,
5 perhaps up to 600,000, irrigation, municipal and
6 industrial users. The city of Wichita and GMD2 have
7 gained valuable information through the recharging
8 of more than one million gallons of water. We are
9 encouraged as well that this information is being
10 used to ensure the appropriate environmental
11 protection of the aquifer.

12 South Central Kansas economy, including the
13 Wichita MSA represents more than 20 percent of the
14 state's employment, more than a third of the state's
15 manufacturing employment and payroll, and at least
16 20 percent of the state personal income. So the
17 quality of life and economic future of more than
18 20 percent of the state's population and economy is
19 dependent upon the availability of reliable, high
20 quality water resources from the equus beds. When
21 fully developed, the city of Wichita will have water
22 resources to the mid-21st Century to support the
23 anticipated growth of the Wichita MSA.

24 The project is also essential, as we've heard,
25 to protect from salt intrusion with the hydraulic

1 MR. NICHOLS: My name is Bob Nichols. I
2 live in Butler County, just west of Sedgwick County,
3 and I live at 13913 Southwest Prairie Creek Road,
4 Rose Hill, Kansas 67133. I'm retired military. I
5 spent 30 years in the military. I'm a veteran of
6 the Korean War and the Vietnam War. I currently
7 serve Rural Water District Number 8, which is served
8 by city of Wichita. Also serve on the Butler Rural
9 Electric Board, which serves electricity to six
10 surrounding counties. I serve on the wholesale --
11 excuse me -- I serve on the wholesale power board,
12 it's an organization called KEPCo, represents 19
13 electric co-ops, along with -- along with Westar
14 Energy, Kansas City Power & Light. We're the owner
15 of the Wolf Creek generating plant.

16 I'm here to support the city of Wichita
17 because in 1981 in the neighborhood I lived in we
18 had several problems with water. One being a
19 shortage of water, or no water, if you may. The
20 other was being the water -- the water being very
21 hard had to be treated. Then came along the problem
22 of nitrates which contaminated the water, and this
23 is caused by overindulgence in farming fertilizers,
24 and this kind of thing in the groundwater. So since
25 then the city of Wichita has served us good water,

1 very good water.

2 I think it's a bold action that the city of
3 Wichita is willing to do this project that they're
4 wanting to take on to serve their neighbors, be
5 unselfish, and give not only the residents of
6 Wichita but the neighboring communities, and I could
7 name them but there's a lot of them, so I'll pass
8 with that, but they serve them good, viable water.
9 This is the spirit of the co-ops that I mentioned
10 above that I belong to is to serve the neighbors, to
11 make sure the neighbors out in the rural area like
12 in the place where I belong, that serving them with
13 utilities, including water and other utilities, to
14 increase and raise the standard of life for all
15 those people. I grew up on a farm, and we had
16 little or no water, and we had no electricity, so I
17 know about these utilities and I know about the
18 spirit of the co-op in serving and being neighbors
19 to your neighbors. I feel this is an honorable
20 project for the city of Wichita to take on, bless
21 it, and I hope you approve it. Thank you.

22 HEARING OFFICER POPE: Thank you. Mike
23 McGinn.

24 MIKE MCGINN,
25 having been first duly sworn, testified on his

1 to bring forward are, that the drawdown of the river
2 over the -- with the use of the additional sites
3 over the past two to three years -- the past two of
4 the past three years, one of our permits that we
5 hold has been shut off for usage during those years.
6 We haven't been allowed to use that permit, yet we
7 have a surplus of water in the river, and that
8 concerns me.

9 I also have a -- the same concerns that some
10 of the others do with the quality of the water that
11 is affecting the aquifer, and the preservation of
12 that for the future, be that the failure of
13 mechanical or what the safeguards are in the quality
14 of the water that's recharged into the aquifer.

15 Also have some concerns about the safe yield
16 and how that will affect past and future permits. I
17 also have some concerns about the need for
18 additional discharge sites and why that is.

19 And something that has puzzled me in the past,
20 and maybe it's just something that I don't
21 completely understand, but the project is in inverse
22 relationship to the base flow nodes along the river
23 that I have not understood exactly how that works,
24 maybe I need to research that more deeply, but we
25 have two different directions of flow of the water

1 oath as follows:

2 MR. MCGINN: My name is Mike McGinn. I'm
3 a fifth generation farmer and stockman, business
4 owner, in the Sedgwick area. I live in section
5 33-24-01 west of Sedgwick Township. I do understand
6 the needs for water in the Wichita area and the
7 surrounding communities such as REAP, and I respect
8 the city of Wichita's conservation attempts and
9 practices to preserve the same water that is
10 important to both myself and the generations to pass
11 before us.

12 I do and will probably reside in stage three
13 of the recharge project and own property in that
14 stage, which is the potential to be a site, and I
15 have attempted to attend most of the meetings set
16 forth in the district to gather information. I
17 wouldn't say that I'm highly versed in all the
18 information, but I've attempted to gather
19 information. Those meetings given by the city of
20 Wichita, the equus beds number two GMD, and also
21 gathering information given by our -- the consultant
22 hired, Mr. Carl Nuzman.

23 Some of the questions that I had gathered
24 through that experience of information that I don't
25 completely have the answers to, I guess that I want

1 there. And those are the main concerns that I have,
2 I guess. I appreciate your time.

3 HEARING OFFICER POPE: Thank you. I may
4 have a question. Mr. Rolfs, first, do you have --

5 MR. ROLFS: I'm sorry. I didn't get your
6 section, township and range.

7 MR. MCGINN: It's Sedgwick Township,
8 Section 33-24-1 west.

9 MR. ROLFS: And you mentioned a permit
10 that was shut off. What permit number was that?

11 MR. MCGINN: I don't have the permit
12 number with me. I could --

13 MR. ROLFS: Is it at that same location?

14 MR. MCGINN: No. It's near the city of
15 Halstead.

16 MR. ROLFS: Okay.

17 MR. MCGINN: That is a surface water
18 permit.

19 HEARING OFFICER POPE: I was going to
20 follow up a little bit on that also. This was a
21 permit that was shut off by order of our office, is
22 that correct?

23 MR. MCGINN: That is correct, Mr. Pope.

24 HEARING OFFICER POPE: Was there a stated
25 purpose for that?

1 MR. McGINN: Too low -- below the base
 2 flow of the river.
 3 HEARING OFFICER POPE: Can you be just a
 4 little more specific in terms of when that was?
 5 MR. McGINN: That would have been in the
 6 years -- seasons 2002 and 2003.
 7 HEARING OFFICER POPE: In the irrigation
 8 season?
 9 MR. McGINN: That's correct.
 10 HEARING OFFICER POPE: In other words,
 11 July or August or --
 12 MR. McGINN: Right.
 13 HEARING OFFICER POPE: -- something like
 14 that?
 15 MR. McGINN: Bruce would probably know
 16 those. I had discussion with Bruce on that in the
 17 past.
 18 HEARING OFFICER POPE: Okay. We probably
 19 have records on that so we could know specifically.
 20 MR. McGINN: That's correct.
 21 HEARING OFFICER POPE: Do you know if
 22 that happened to be -- you may not have any way of
 23 knowing this, but at the same time, did there happen
 24 to be any operations of the demonstration project?
 25 MR. McGINN: I have no knowledge of that.

1 I would assume that there wasn't.
 2 HEARING OFFICER POPE: Okay. Well, I
 3 would hope not.
 4 MR. McGINN: Yeah.
 5 HEARING OFFICER POPE: The other question
 6 I had, again just to clarify, make sure I understand
 7 your points here, and your concerns, you raised a
 8 question about the need for additional discharge
 9 sites.
 10 MR. McGINN: Yes.
 11 HEARING OFFICER POPE: Can you explain to
 12 me what you mean by discharge sites?
 13 MR. McGINN: The project states that --
 14 in my understanding, anyway, and I'll say it's a
 15 limited understanding, in comparison to many of the
 16 others, that there will be additional discharge
 17 sites drilled in the aquifer in order to recover the
 18 recharged water. And maybe I'm incorrect about
 19 that, but that's the way I understood it.
 20 HEARING OFFICER POPE: Recovery.
 21 MR. McGINN: Recovery.
 22 HEARING OFFICER POPE: Is what you're
 23 saying? Okay. Okay.
 24 MR. McGINN: For future use.
 25 HEARING OFFICER POPE: At some time in

1 the future.
 2 MR. McGINN: Right.
 3 HEARING OFFICER POPE: Right. Okay. I
 4 understand what your question is about. You're --
 5 now I understand what type of sites you're talking
 6 about now, I think, but is your concern that there
 7 would be additional locations at some time in the
 8 future that are not now proposed?
 9 MR. McGINN: And allow for additional
 10 usage that's not permitted. Maybe I don't
 11 understand that completely.
 12 HEARING OFFICER POPE: Well --
 13 MR. McGINN: I'm not sure why there is
 14 the need for them. Maybe that's how I should state
 15 it.
 16 HEARING OFFICER POPE: Your concern is
 17 you're not sure there's a need for additional
 18 recovery sites beyond what has now been proposed or
 19 the ones that have been proposed?
 20 MR. McGINN: The ones that are currently
 21 in place, the sites that are now currently in place,
 22 those permitted wells, that will only have the need
 23 for those additional discharge sites in addition to
 24 the current wells that are permitted in place.
 25 HEARING OFFICER POPE: Okay. I think I

1 understand your concerns.
 2 MR. McGINN: Okay.
 3 HEARING OFFICER POPE: Okay. Thank you.
 4 MR. McGINN: Thank you. Appreciate it.
 5 HEARING OFFICER POPE: Let me call one
 6 more time to see if Mr. Weber, Mr. John Weber, by
 7 chance is in the room now. I know he signed up
 8 earlier today and he may have had to leave.
 9 Let me ask at this point -- that's all the
 10 cards that I have that have been turned to me at
 11 this point in time. Are there other individuals
 12 that are here this evening that wish to make a
 13 statement that by chance have not signed up? Okay.
 14 I don't see any at this point in time.
 15 MR. NEUWAY: Can we make additional
 16 statements? Or that's not allowed?
 17 HEARING OFFICER POPE: Do you have some
 18 additional points that you --
 19 MR. NEUWAY: Well, one thing I kind of
 20 skipped over --
 21 HEARING OFFICER POPE: Excuse me. Excuse
 22 me just a second here. If you want to come forward
 23 to the microphone for a brief additional comment,
 24 we'll allow that. Keep it very brief here.
 25 MR. NEUWAY: In my presentation I forgot

1 to state that I feel that I should be allowed, if
 2 they do put water into the storage facility close to
 3 my property, that I should be entitled to two
 4 independent tests per year done by a test facility
 5 of my choosing, paid for by Wichita, for an analysis
 6 of comparison for the water quality before and after
 7 the storage. And I know all the people that are
 8 speaking for the project, I can see where that they
 9 seem to think this is a magic bullet that is going
 10 to prevent or provide water forever and ever. I
 11 cannot believe that that much recharge is going into
 12 the little river basin that this thing will be able
 13 to sustain Wichita's economy, and I think Wichita
 14 should look for other sources of water other than
 15 the storage and recharges. I know what it would be
 16 like if somebody 50 miles upstream would want to put
 17 in the same system, how much Wichita would holler.
 18 They would not get it done. And that's about all
 19 I've got to say. I thank you.

20 HEARING OFFICER POPE: Thank you,
 21 Mr. Neuway. Okay. With that, I believe, unless I
 22 have missed someone, and I don't believe anyone is
 23 indicating at this point a desire to make additional
 24 statements, so at this point I will close the public
 25 comment period of the hearing.

1 I want to personally thank each of you that
 2 have taken the time to come this evening and make
 3 your statements and those as well that have
 4 submitted written statements, or both, so again I
 5 appreciate that. I see that it's just after eight
 6 o'clock. I will recess the hearing. We close the
 7 public comment period at this point, recess the
 8 hearing and would ask that the participants in the
 9 formal portion of the hearing be prepared to
 10 continue this evening, and we will start that in
 11 about 10 minutes or so. Thank you very much.

12 (There was a recess from 8:04 p.m.
 13 to 8:12 p.m.)

14 HEARING OFFICER POPE: We're going to be
 15 reconvening the formal portion of the hearing.
 16 Members of the audience, you're certainly welcome to
 17 stay. Would like everyone to get their seats that
 18 does want to stay. Let me ask counsel for the
 19 parties if you're ready to proceed.

20 MR. HINKLE: (Nodded head up and down.)

21 MR. ADRIAN: We're ready.

22 HEARING OFFICER POPE: Okay. Are we back
 23 on the record?

24 THE REPORTER: Yes.

25 HEARING OFFICER POPE: Okay. We will

1 proceed, if I can get those individuals that are
 2 visiting to either take your chairs or take your
 3 conversations outside.

4 Mr. Hinkle, did you have cross-examination for
 5 Mr. Dealy?

6 MR. HINKLE: I do, Your Honor.

7 HEARING OFFICER POPE: Mr. Dealy, if you
 8 could retake the witness stand.

9 MR. HINKLE: Mr. Pope, I have a an
 10 initial procedural question that I think will
 11 shorten my examination a great deal.

12 HEARING OFFICER POPE: Okay.

13 MR. HINKLE: In the document that was
 14 filed today, the review of the city of Wichita's
 15 motion for modification of applications number
 16 45,569, 45,572, 45,567, and 46,081, it was admitted
 17 as an exhibit this morning without objection. In
 18 the review today, we have determined that this
 19 document contains a number of statements that vary
 20 significantly from the agreed MOU, in particular
 21 statements that set a water quality standard
 22 different from that set out in the MOU at
 23 paragraph 8. We have conferred with representatives
 24 of the GMD, and that is in error. I believe it will
 25 be acknowledged as such and that a replacement

1 document that contains language that mirrors that
 2 found in the MOU will be filed. And if that's the
 3 case, I just -- I'll just have a couple of
 4 questions for Mr. Dealy, but I'd like to confirm
 5 that.

6 MR. ADRIAN: Yes. That was pointed out
 7 to me, and in our conference I agreed -- we agreed
 8 that the Memorandum of Understanding is -- prevails
 9 when there's an inconsistency with the review, and
 10 there is an inconsistency repeated I think probably
 11 three times or so, so we would advise you that he is
 12 correct in saying that the Memorandum of
 13 Understanding, the standards set out in the
 14 Memorandum of Understanding is the standard that
 15 should be applied. With regard to filing a
 16 substitute document, we haven't really finalized how
 17 that will be done or what that should look like. I
 18 suppose we could do it in a one-page amendment to
 19 those portions, if that would be all right, but we
 20 will provide you with a written clarification of
 21 that.

22 HEARING OFFICER POPE: I understand that
 23 there's not a disagreement amongst the parties in
 24 regard to this particular item, so I believe it
 25 would be appropriate to simply ask the district to

1 file the amendment or supplement to this, which I
2 believe was marked as District Exhibit 4, was it?

3 MR. HINKLE: That's correct.

4 MR. ADRIAN: It is, yes.

5 HEARING OFFICER POPE: And if you
6 would -- sounds like that counsel have conferred.
7 If you would do that and if that document could be
8 submitted within say the next 15 days or so, then it
9 would -- I know we have holidays coming up. Is
10 that --

11 MR. ADRIAN: Oh, I'm sure Mike can do it.

12 MR. DEALY: No problem.

13 HEARING OFFICER POPE: If you need more
14 time than that, I'd suspect that we'll have time to
15 do that, but I'll just leave it to you to say
16 approximately that amount of time, and if that will
17 be submitted to the record -- excuse me.

18 MR. ROLFS: You might work it out so you
19 submit it to Wichita so they can look it over and
20 make sure that you're both in agreement with what's
21 coming in.

22 MR. ADRIAN: We will do that.

23 HEARING OFFICER POPE: That's fine. In
24 our final comments, we'll see whether there's other
25 issues that we need to resolve it, but thank you.

1 understood your testimony to effectively say that.
2 Would you agree with that statement?

3 **A The conditions that have been recommended to the
4 chief engineer by the board for the specific
5 applications as well as the MOU set up a system of
6 monitoring and data collection that basically will
7 ensure that those bank storage wells will be pumping
8 bank storage water.**

9 Q All right. Thank you. And issue number six asks if
10 those same recommendations from GMD2, including the
11 provisions of the MOU, as to the flows that must be
12 passing the bank storage wells before bank storage
13 water may be diverted by the wells, if those
14 standards are adequate to protect the existing
15 downstream water rights from impairment, minimum
16 desired stream flows and ensure the public interest?

17 **A Again, those conditions that are in each of the
18 applications and the MOU set forth the stream flows
19 during certain times of the year that will protect
20 not only minimum desirable steam flow base flow and
21 downstream users, surface water users.**

22 Q And issue number eight, we may have effectively
23 addressed this already in the stipulation before
24 your questioning here, whether modification of these
25 applications and the filing of the new application

1 MICHAEL T. DEALY,
2 recalled as a witness, having been previously duly
3 sworn, testified further as follows:

4 CROSS-EXAMINATION

5 BY MR. HINKLE:

6 Q Mr. Dealy, you are familiar with the changes in the
7 city of Wichita's plan that are described in the
8 modification of the applications and the new
9 application.

10 **A That's correct, yes, I am.**

11 Q Those modifications and the new -- and the new
12 application don't alter the scope of the project, do
13 they?

14 **A No, they don't.**

15 Q And you do believe that the provisions in the MOU do
16 adequately protect the public interest in this
17 matter?

18 **A That is correct.**

19 Q A couple of the issues we have yet to directly
20 address that are -- were set out in the prehearing
21 order, specifically number four, request that -- are
22 the recommendations of GMD2 including provisions of
23 the Memorandum of Understanding with Wichita
24 adequate to ensure that only bank storage water be
25 will be diverted by the bank storage wells? I

1 are significant enough to change the nature and
2 impact of the proposed project. I think you said,
3 no, it isn't an alteration in scope, is that right?

4 **A The conditions -- or the modifications of the two
5 bank storage wells and the modification or change in
6 the location of the one ASR well do not materially
7 alter the overall phase one of the project.**

8 Q Okay. And just to use the exact language requested
9 of the chief engineer, they don't alter the nature
10 and impact of the proposed project.

11 **A That's correct.**

12 Q They do not necessitate changes to the city of
13 Wichita's groundwater and accounting model, do they?
14 Or, if so, those are taken into account.

15 **A The model that was presented today, the accounting
16 model --**

17 Q Yes.

18 **A -- and the information that I saw today, that was
19 the first time I've actually seen the examples that
20 were presented, and looking at that, plus what the
21 modifications that are going to be made, I don't see
22 that that's going to effectively change that
23 accounting system.**

24 Q Additionally, these modifications in the new
25 application don't affect the substance of your -- of

1 the GMD2's recommendations concerning the proposed
2 project, including its MOU, except to the extent
3 specifically stated, is that correct?

4 I mean, you have, obviously in this document
5 that you filed, submitted modifications that reflect
6 those modifications in the application.

7 **A That is correct.**

8 **Q** And these will in fact be modified themselves to
9 conform to the stipulation that took place prior to
10 your cross-examination.

11 **A I think the way that we have configured that,**
12 **Exhibit 4, in basically saying that the board of**
13 **directors recommend to the chief engineer that those**
14 **applications are approved subject to the Memorandum**
15 **of Understanding and to the following conditions,**
16 **that the Memorandum of Understanding governs overall**
17 **if there's any questions or any inconsistency in the**
18 **conditions that follow in our response to the city's**
19 **motion.**

20 **Q** You believe that those terms and conditions
21 adequately protect the public's interest in this
22 regard?

23 **A Yes, I do.**

24 **Q** And that they take appropriate -- they have
25 appropriate consideration for and protect the

1 **Q** Yes, sir.

2 **A -- 081, and the recommendations that are submitted**
3 **with our response to your MOU.**

4 **Q** Yes.

5 **A That is correct.**

6 **Q** And that these modifications and the new application
7 would not prejudicially and unreasonably affect the
8 public interest.

9 **A That is correct.**

10 **Q** Indeed, that's the reason for the terms of the MOU
11 and the additional terms and the response comments,
12 is that correct?

13 **A Yes. And specifically stated within the conditions**
14 **are those words that the -- that either the bank**
15 **storage wells or the ASR wells cannot impair**
16 **existing users or prejudicially affect the public**
17 **interest.**

18 **MR. HINKLE:** Thank you. I have nothing
19 further.

20 **MR. ADRIAN:** I have no redirect.

21 **HEARING OFFICER POPE:** Okay. There is no
22 redirect. Let me ask Mr. Rolfs if he has questions.

23 **EXAMINATION**

24 **BY MR. ROLFS:**

25 **Q** I just had one question. Back when you were doing

1 downstream water right holders from impairment.

2 **A The conditions that were set forth in our**
3 **recommendations specifically addressing the stream**
4 **flows in the Little Ark River and setting the base**
5 **flow triggers, include provisions for minimum**
6 **desirable stream flow, base flows, and existing**
7 **downstream surface water users, so they would be --**
8 **all three of those would basically be adequately**
9 **protected.**

10 **Q** And you --

11 **A Protected under the conditions and recommendations**
12 **that have been made to the chief engineer, including**
13 **the Memorandum of Understanding.**

14 **Q** And you understand that question relates to the
15 modified applications and the new application.

16 **A That is correct.**

17 **Q** That the -- you would also agree that the
18 modifications and the new application when viewed in
19 conjunction with the MOU and the additional agreed
20 terms would not cause impairment of water rights
21 with a priority senior to the date these
22 modifications were requested and the new application
23 filed, is that correct?

24 **A We're specifically talking about the new**
25 **application, 46 --**

1 your presentation, I think on your first condition
2 15, you were running through some numbers about cfs
3 values, and the first one was 57 cfs it showed on
4 the screen, and I think you said 75 cfs when you
5 were talking about it verbally. Were you -- which
6 one of those is correct?

7 **A 57. I inverted those. It should be 57. It would**
8 **be the cubic feet per second for the base flow that**
9 **would be equal to or less than would be considered**
10 **base flow at the Halstead gage.**

11 **MR. ROLFS:** Thank you, then. I have no
12 further questions.

13 **HEARING OFFICER POPE:** Mr. Bagley.

14 **EXAMINATION**

15 **BY MR. BAGLEY:**

16 **Q** Just one question. With the -- moving those two
17 bank storage wells further north, I notice there was
18 some domestic wells to the south that you're moving
19 away from, which would apparently improve the
20 spacing to those. I was wondering, because the
21 monitoring wells that were going to be in there had
22 also moved to the north, are those domestic wells,
23 by any chance, something that be can be measured,
24 water levels measured?

25 **A The provisions of our recommendation talk about that**

1 within a quarter of a mile of a bank storage well
 2 that there shall be water quality samples collected
 3 to set an ambient baseline. Typically when we take
 4 a water level sample we also grab a water level.
 5 But specifically we have not addressed the water
 6 levels in that regard.

7 Q I guess my question more relates to the fact that
 8 the monitoring wells that were going to be in place,
 9 if those two originally filed for locations are bank
 10 storage wells, had they stayed there, you had some
 11 monitoring wells that were going to go in there.
 12 When those wells were moved back to the north and
 13 west, the monitoring wells that were going to go in
 14 also moved with them, as I understood, and my -- I
 15 guess initially I thought the lower -- where the
 16 lower wells -- or the wells that were proposed
 17 originally, there was some monitoring wells that
 18 would be in the vicinity, which they're not going to
 19 be there now, according to this proposal, and I was
 20 curious if those domestic wells in that area could
 21 be measured in lieu of.

22 A We didn't specifically include that in our
 23 recommendations. If you're looking at more of a
 24 informal data collection type situation, yes, we can
 25 certainly measure the water levels in those wells.

1 there at Halstead. When we looked at the -- setting
 2 the base flows for these seven bank storage wells,
 3 we agreed that the gage at the Halstead -- or at the
 4 Little Ark River at U.S. 50 would be the -- still
 5 remain the same -- you know, the gauging station for
 6 those seven bank storage wells.

7 What we had to do basically was to look
 8 upstream and go north of the bank storage
 9 northernmost well, and then include in any bank
 10 storage -- not bank storage, but base flow nodes,
 11 add that to that 42 cfs, plus add any upstream
 12 user -- or downstream users from that point, and add
 13 that to that 42 cfs, which then reset the value for
 14 base flow to 57 cfs at the Halstead gage.

15 Q So if I understand correctly, and if the city wants
 16 to address this from that perspective, they'll have
 17 an opportunity to ask some questions, too, but -- so
 18 the value at the Halstead gage would then be 57 cfs,
 19 and that does account for intervening water rights
 20 and base flow nodes?

21 A That's correct.

22 Q So there's no further adjustment needed from the 57.
 23 That is the adjusted value.

24 A That is base flow trigger, but in order to operate a
 25 bank storage well, they would have to -- flows at

1 MR. BAGLEY: Okay. I think that's all.

2 EXAMINATION

3 BY HEARING OFFICER POPE:

4 Q Mr. Dealy, I have a couple of questions that I think
 5 largely are follow-up to something Mr. Rolfs was
 6 trying to also get clarified, and that was on the
 7 stream flow values that would be a condition of this
 8 project. I had jotted down here, and certainly the
 9 testimony and the documentation will govern, but for
 10 the two different periods of the year, I think it
 11 was April 1 through September 30, the 57 cfs, and
 12 the October 1 through March 31, 20 cfs, as the
 13 recommended flows that would need to be met before
 14 the project could operate, I want to first confirm
 15 that I have those right, because I thought I also
 16 understood in some earlier testimony or one of the
 17 documents, something about 42 cfs for the earlier
 18 period. Is there -- are the district's
 19 recommendations different than what were otherwise
 20 proposed, or is there some -- I just want to make
 21 sure I understand at least what the district's
 22 recommendation is and if there's other clarification
 23 needed.

24 A I heard, that, too, on the city's testimony, 42 cfs.
 25 Now, 42 cfs was used for the demonstration project

1 the Halstead gage along U.S. 50 would have to be 57
 2 cfs, plus the quantity of the bank storage well in
 3 order to turn on.

4 Q That's the further adjustment you had spoken of
 5 earlier, so --

6 A You're going to have this -- what we wanted to
 7 prevent was to -- if we get a flow of like 60 cfs at
 8 the Halstead gage, we didn't want all seven bank
 9 storage wells going on all at once because they
 10 would -- the combined total pumpage of those would
 11 be -- would exceed and bring us -- or exceed the 57
 12 cfs and then cause stream impairment, so what we're
 13 doing is basically saying, if you -- we have
 14 maintain -- we have to have 57 cfs plus, and this
 15 would be 2.23 cfs for each bank storage well. So in
 16 order to turn on the first bank storage well, you
 17 would have to have flows at the Halstead gage of
 18 59.23 cfs. You turn on a second one, you're going
 19 to have to progressively add those, it's a
 20 cumulative effect, to get them all up to the seven
 21 bank storage wells operating at once.

22 Q And that methodology is spelled out in the detail in
 23 your recommendations?

24 A That's correct.

25 Q Okay. Now, you mentioned the existing surface

1 rights that would exist in this same reach. Is your
2 proposal that that -- the amount of the pumping rate
3 be added in, much in the way that the rate for the
4 bank storage wells would be, or -- or on a real-time
5 operational basis?

6 **A The pumping rate for those existing surface water
7 rights are already in the 57 cfs, so those are in
8 there and basically protected.**

9 Q Okay. So no further adjustment would be needed for
10 them.

11 **A That's right.**

12 Q That being 57, but if two bank storage wells were
13 being simultaneously operated, you're saying that
14 then the gage flow would actually need to be 57 plus
15 2.23 plus 2.23.

16 **A Correct.**

17 Q To get to a total value that should be measured at
18 the gage.

19 **A That's correct. And the same way on the down curve.
20 As the flow decreases, as it comes down, then
21 they're going to have to start shutting the wells
22 off if they don't meet that flow.**

23 HEARING OFFICER POPE: Okay. I think I
24 understand that. Okay. I don't believe I have
25 further questions, unless there's some -- let me ask

1 Q State your name, address and occupation, please.

2 **A Bob Seiler, 13501 West 85th North, Valley Center.
3 I'm a farmer/dairyman south of Bentley.**

4 HEARING OFFICER POPE: Mr. Seiler, would
5 you move the mic up a little bit higher. You may
6 have to speak up just a little bit so people can
7 hear.

8 **A In this part of the hearing I've decided I'm the
9 only one that isn't being paid to be here, and I
10 think that probably makes my testimony very unsound,
11 doesn't it?**

12 Q I think you're the only one without Power Point.
13 You are a member of the Equus Beds Groundwater
14 Management District Board, are you not?

15 **A Yes, I am.**

16 Q Do you hold an office with that board?

17 **A Been on the board four years and I've been president
18 now for two years of that board.**

19 Q Would you -- I want to direct your attention to the
20 process that the board went through in considering
21 and eventually recommending these applications that
22 are under consideration today.

23 Would you begin, however, but describe how the
24 board considers what I would call the more common
25 applications that come before the board, how are

1 specifically city of Wichita if you had any further
2 questions. I may have -- I didn't want -- I want to
3 make sure I didn't generate some concern or some
4 questions that need to be clarified on this last
5 point.

6 MR. HINKLE: No. We're fine.

7 MR. ADRIAN: Nothing further.

8 HEARING OFFICER POPE: No further
9 redirect. Thank you, Mr. Dealy.

10 **A Thank you, Mr. Pope.**

11 HEARING OFFICER POPE: You may step down:

12 MR. ADRIAN: Call Bob Seiler.

13 BOB SEILER,
14 called as a witness, having been first duly
15 sworn, testified as follows:

16 DIRECT EXAMINATION

17 BY MR. ADRIAN:

18 Q Would you state your name, address and occupation.

19 **A Bob Seiler. Let me get this on right.**

20 Q Excuse me.

21 **A Bob Seiler. Can you hear?**

22 HEARING OFFICER POPE: It's probably not
23 turned on.

24 Q I jumped the gun. I'm sorry.

25 **A I'm not that high tech.**

1 those handled?

2 **A Normally on a common application, it will be
3 approved by staff, or disapproved, and then we will
4 as a board, if the applicant desires an appeal, they
5 will appeal to the district and the board will hear
6 the appeal. Normally, we do not hear applications
7 on a normal basis. Our usual basis is most of them
8 are handled -- if there's no regulation problem,
9 they're all handled by staff.**

10 Q So really the staff is given a standard to use to
11 apply to those applications. If they meet that
12 standard, then they're approved; if they don't, then
13 they come -- they have the right to appeal to the
14 board, and that's when you hear them.

15 **A Yes.**

16 Q The process that was followed with these
17 applications -- well, first of all, these
18 applications were like none you'd ever seen before,
19 isn't that correct?

20 **A Yes, but we have dealt with probably three
21 applications in this matter in the last couple
22 years, I guess, that we thought were a little more
23 unusual and a little more -- needed to take extra
24 time by the board, in effect, and that's -- this
25 application was a first of its kind, and we thought**

1 it was very important to the district and we thought
 2 it was imperative that the board take action on it.
 3 Q So what happened was that you eventually arranged
 4 for and held a public hearing, did you not?
 5 A Yes, we did.
 6 Q And that took place when and where, if you recall?
 7 A We had that hearing July 27th. The board had -- or
 8 the staff had went through the applications and made
 9 their recommendations and had that available for us
 10 that day, and we had also hired Carl Nuzman, a
 11 hydrologist that we heard earlier today, the board
 12 had hired him a year ago, and we had him prepare
 13 stuff for that day.
 14 Q You had some public input also that day, did you
 15 not?
 16 A Yeah, we had probably 50 people at the hearing, and
 17 we had -- we really wanted to give the public a
 18 chance to talk about it. It probably deflected some
 19 of the hearing tonight maybe from David, and you
 20 ought to thank us for that, but we did really want
 21 to make it an opportunity for the patrons of the
 22 district -- the patrons of this district live in the
 23 district and that's -- we've heard tonight from
 24 several people that live outside the district and
 25 are -- and are using our water, and would have a

1 stake, and we felt like it was an important stake to
 2 listen to.
 3 Q At that board meeting, at the -- on the same
 4 location at the same time that you held the public
 5 meeting you did discuss these applications and what
 6 action the board should or could take in that
 7 regard, did you not?
 8 A Yes. We gave Jerry Blain an opportunity to address
 9 the board and Carl and Mike and Don Koci, who is
 10 here, gave their recommendations, and then the board
 11 spent quite a bit of time in discussion on -- after
 12 some patrons did give their testimony, too, but the
 13 board spent quite a bit of time in discussion, and
 14 we were I guess getting close to impasse probably,
 15 of no decision, and David Warren from the city of
 16 Wichita offered to sit down with a couple
 17 representatives of the board and our staff and our
 18 consultant and see if we could work through some of
 19 main issues that were of concern.
 20 Q Did you do that?
 21 A Yes, we did.
 22 Q Do you remember when you did that?
 23 A The first few days of August, I believe, is what the
 24 time frame was.
 25 Q And that meeting I assume was held in Wichita at the

1 city office or --
 2 A Yeah, we went to city hall and Dave Warren and David
 3 Stous from Burns and Mac and Jeff Klein were
 4 involved, and myself and Frank Harper, our vice
 5 president, Mike Dealy was there, and Carl Nuzman.
 6 And we went over the issues of concern that I think
 7 Carl expressed earlier in his testimony, and then
 8 also his exhibit here.
 9 Q The net result of that meeting with the city and the
 10 people that you've mentioned was a document entitled
 11 the Memorandum of Understanding, is that correct?
 12 A Yes, it was.
 13 Q And that's the same memorandum that has been
 14 referred to frequently throughout this hearing
 15 today.
 16 A Yes, it is.
 17 Q Did you -- so that memorandum was prepared in
 18 various forms and edited, was it not, and eventually
 19 it came to the board for consideration and vote.
 20 A Yes, we reviewed it. The people that were involved
 21 in the meeting reviewed it, and then we reviewed it
 22 together before our August board meeting and then it
 23 was presented to the board at the August meeting.
 24 We took a couple hours going over the MOU, and David
 25 Warren was there to help facilitate that, and so we

1 had input from both sides.
 2 Q So would it be fair to say that you felt that there
 3 was adequate input into this memorandum, and you --
 4 you and I think Frank Harper was also at that
 5 meeting, were able to recommend it to the board for
 6 adoption?
 7 A Yes. We felt like -- the board, you know, all along
 8 has felt the need to do something about the salt
 9 plume and try to retard that flow and also help on
 10 the south with the big river, salt intrusion, and we
 11 felt that there was a need to be involved in this
 12 project. We wanted it done right, and we felt like
 13 we'd like to be a player in it, if it was done, and
 14 we wanted to be a participant in it, hopefully,
 15 if -- if the project could be done correctly.
 16 Q The Memorandum of Understanding, then, was -- with
 17 the attachment to it and the recommendations that
 18 were previously sent to -- or the recommendations
 19 were sent to the chief engineer as a result of the
 20 action of the board, were they not?
 21 A Yes, they were.
 22 Q And I think the action of the board, if I recall
 23 correctly, was unanimous, was it not?
 24 A No.
 25 Q No?

- 1 **A Jerry abstained.**
 2 Q Oh. You're referring to Jerry Blain, are you not?
 3 **A Yes, I am.**
 4 Q So with that abstention, all the other votes were in
 5 the affirmative --
 6 **A Yes.**
 7 Q -- were they not?
 8 **A Yes, they were.**
 9 Q I guess it would be fair to say, would it not, that
 10 you -- the board certainly isn't -- or is sensitive
 11 to the concerns, as you said earlier, of the
 12 patrons, of the residents within the district.
 13 **A I think we've spent probably two and a half years on**
 14 **this project and I can guess almost 25 percent of**
 15 **our board meeting time on listening to the ASR and**
 16 **trying to understand the issues, and we are very**
 17 **concerned about them issues, and I think we've -- we**
 18 **see the good side, we see the risk, and we hope that**
 19 **the good side will offset the risk.**
 20 Q And some of the areas of specific concern you had as
 21 I recall were -- dealt with the water that will be
 22 withdrawn in the bank storage wells, and you felt
 23 that was adequately addressed in the Memorandum of
 24 Understanding?
 25 **A Yeah, I think it was. We put in the stipulations of**

- 1 not?
 2 **A Yes. Yes, we do.**
 3 Q So I -- would -- it would be fair to say, would it
 4 not, that if you do anticipate -- or observe some
 5 problem arising that the board -- you feel like
 6 you've retained enough authority and jurisdiction to
 7 take some further action?
 8 **A We would like to be a player.**
 9 Q So all in all you feel that the recommendation of
 10 the board and the Memorandum of Understanding are
 11 adequate to protect the public interest?
 12 **A Yes. I hope so. I mean, I hate to be -- yes,**
 13 **because I don't have the lawyer skills that some of**
 14 **these people have, and I hope we've made the right**
 15 **decisions, and the other thing that we did put in**
 16 **was the four year -- we called it a sunset, but more**
 17 **or less a four-year review of what's happening with**
 18 **the bank storage wells where we can make adjustments**
 19 **if we need to or change order, or even if it isn't**
 20 **working, we can stop the project.**
 21 Q You've also considered as a board the motion for
 22 modification, the change in the wells that again
 23 have been referred to extensively today and it was
 24 board action to approve those essentially as
 25 Mr. Dealy reviewed.

- 1 the 1,000 per minute per bank storage well, and then
 2 we also put in the -- added the screen to the upper
 3 aquifer, so we have continuous screening through the
 4 upper and lower aquifer on the bank storage wells.
 5 We hope that that will ensure that the water is bank
 6 storage water. In order for this project to work,
 7 it has to be bank storage water. We don't want to
 8 recirculate water, we want to make sure we are
 9 taking new water to the aquifer and recharging it,
 10 or the project has a very limited effect. So that's
 11 a very important issue.
 12 Q And do you feel that the recommendations of the
 13 board were adequate also to protect the downstream
 14 water rights from impairment?
 15 **A Yeah, I think we have -- we have, to the best of our**
 16 **knowledge, we've been able to -- we've done that, I**
 17 **hope. Time will only tell, and that's -- you know,**
 18 **it's easy to sit up here and say, yes, we've taken**
 19 **care of that, and, yes, it's going to work, but we**
 20 **hope we've made the right safeguards to make the**
 21 **project work; and if it doesn't work, we hope we**
 22 **have the safeguards in place that we can adjust the**
 23 **project.**
 24 Q Well, you also have considerable and continuous
 25 board involvement in review of this matter, do you

- 1 **A Yes, it was. Didn't see any changes that would**
 2 **affect what we had already decided and confirmed.**
 3 MR. ADRIAN: All right. I think I have
 4 no other questions then.
 5 CROSS-EXAMINATION
 6 BY MR. HINKLE:
 7 Q Mr. Seiler.
 8 **A Yes.**
 9 Q You still stand -- the board still stands by the MOU
 10 and the powers of review that it gives you, don't
 11 you?
 12 **A Yes.**
 13 MR. HINKLE: I have no further questions.
 14 HEARING OFFICER POPE: Okay. There's no
 15 questions from Mr. Rolf's or Mr. Bagley, and I don't
 16 know that I do either, Mr. Seiler. Appreciate your
 17 time and comments. And I know the district has put
 18 an awful lot of time and effort into this project,
 19 you personally and other members of the board.
 20 THE WITNESS: I appreciate what they've
 21 done. Thank you.
 22 HEARING OFFICER POPE: Let me -- I'm
 23 sorry. Did --
 24 MR. ADRIAN: I was just going to announce
 25 that I have no other witnesses.

1 HEARING OFFICER POPE: Okay. That was
2 going to be my next question, so thank you.
3 Appreciate that.

4 I wanted to ensure, in regard to some
5 reservation the city had in regard to Mr. Dealy's
6 testimony that you had -- you had taken care of all
7 additional responsive --

8 MR. HINKLE: I did.

9 HEARING OFFICER POPE: -- questions that
10 you had. I'm going to -- if we have no further
11 witnesses, then, I think we'd indicated in the
12 prehearing order that we would provide for an
13 opportunity for brief closing comments. If each of
14 you would like to do that, I do have a couple of
15 other things I want to just in terms of
16 procedural -- ask if there's any procedural
17 questions, and I have a few that we may need to deal
18 with. Mr. Lang.

19 MR. LANG: Mr. Pope, just a couple of
20 exhibit items that we want to get clarified at some
21 point here before we finish.

22 HEARING OFFICER POPE: Why don't we deal
23 with that right now.

24 MR. LANG: Okay. The district, in the
25 four exhibits that they have announced, one of them

1 2004 letter that I recall seeing is the one that was
2 the original recommendations from GMD2, is that
3 correct?

4 MR. LANG: That's correct.

5 (Off-the-record discussion.)

6 HEARING OFFICER POPE: Mr. Bagley is
7 pointing out here that he believes that in the DWR
8 exhibits there are a series of individual exhibits,
9 one for each application, that have these letters of
10 August 12th. There's one for each application, and
11 those are, for example, Exhibit B, C and so forth,
12 dealing with each application. Are -- do you find
13 those in your sets? They should be there, and I
14 think they are.

15 MR. LANG: If they're in yours, why,
16 we're okay.

17 HEARING OFFICER POPE: I think if we've
18 got the official sets here I think we're okay, but I
19 think -- let me just show for the record that it is
20 our intention that each of the letters of
21 recommendation dated August 12th, 2004 with the
22 submittal and the attachments is intended to be a
23 part of these exhibits. I think they are included.
24 But thank you for raising that question. Are there
25 other questions that you --

1 District Exhibit Number 1, which is an August 12
2 letter from the district to the chief engineer, that
3 is identified in DWR's exhibits as Exhibit S, but it
4 does not appear to be there, at least not in our
5 copy. It is -- it's the attachment to each of
6 the -- it's in the list of exhibits that's
7 referenced in each of the applications as being --
8 as being an Exhibit S, GMD letter to chief engineer
9 August 12, 2004, but in our copy at least it's not
10 there, and we just want to make sure it's in the
11 record.

12 HEARING OFFICER POPE: Yes, I appreciate
13 that. Mr. Bagley's going to be checking here right
14 quick. And you're speaking now of the August 12,
15 2004 letters, but the attachment is what you're
16 specifically -- or not the letters at all in there?

17 MR. LANG: This would be the initial
18 recommendation from the district, as we understand,
19 that was later modified by attachment A to the MOU,
20 but the August 12 letter is -- from the district is
21 not is there.

22 HEARING OFFICER POPE: Let me go off the
23 record for just a second and check something.

24 (Off-the-record discussion.)

25 HEARING OFFICER POPE: The August 12,

1 MR. LANG: I have one other, if I may.
2 We submitted and you accepted today a City Exhibit
3 MM, which was an update on the city's access to the
4 properties where it will have wells. As indicated
5 on that, each property we have either a contract
6 signed by the property owner or a letter of intent
7 signed by the property owner. Is -- and chief
8 engineer asked for that by the time of the hearing
9 status. Do you continue to want update on the
10 documentation or will this be sufficient for
11 purposes of issue one?

12 HEARING OFFICER POPE: Just a second.
13 Yes, Mr. Lang, we appreciate the update from today.
14 The answer to your question is yes, I would like to
15 have the updates, so that we would then have the
16 notice and appropriate copies of documents for each
17 of the final contracts or documents that relate to
18 that access. I essentially am saying that we will
19 need those before we act on those applications so
20 that is not a loose end that's not been dealt with,
21 so I believe that's consistent with the rules and
22 regulations that we have in place, and I understand
23 that that's a process that you believe is ongoing
24 with the letters of intent.

25 MR. LANG: That's right.

1 HEARING OFFICER POPE: So is that
2 something that you would expect to be resolved here
3 in the next few weeks or is there a time frame?

4 MR. LANG: Yes, it's very close. And the
5 city council has authorized the mayor's execution on
6 all those. We're just waiting for the final
7 contracts to come in from a few of the property
8 owners.

9 HEARING OFFICER POPE: I think for
10 purposes of the record I will keep the record open
11 for purposes of allowing those documents to be
12 submitted. If for some reason we run into a
13 problem, we will -- I'll reserve the right to deal
14 with that issue in some follow-up way you with you
15 and the other parties, but I'm going to assume for
16 purposes of this proceeding that in due course here
17 in the next few weeks that will be resolved.

18 Likewise, we have another item that we spoke
19 of earlier, and that was the clarification of the
20 Exhibit 4 from the district, and I'll accept that as
21 hearing that the parties are working cooperatively
22 to secure that acceptable language consistent with
23 the MOU that that -- the record will also allow that
24 document to be submitted here in due course in the
25 next two or three weeks, and that will become a

1 them.

2 MR. ADRIAN: I think I had already handed
3 you a copy of ours, but I have no objection to those
4 all being provided to you.

5 HEARING OFFICER POPE: If you did, I have
6 it here in my pile. Is that hard copy or
7 electronic?

8 MR. ADRIAN: It's electronic.

9 HEARING OFFICER POPE: We'll make sure we
10 have that.

11 MR. ADRIAN: I've got another one.

12 HEARING OFFICER POPE: I think you
13 actually did provide that. And, let's see, for the
14 district you just had the one presentation.

15 MR. ADRIAN: Yes, but that contains both
16 Mr. Dealy's and Mr. Nuzman.

17 HEARING OFFICER POPE: Okay. Good. For
18 the city, other than the one from the U.S.
19 Geological Survey, are there other Power Point
20 documents that would be available?

21 MR. LANG: Yes, we are -- I think we have
22 all the rest of the city witnesses on one disk.

23 HEARING OFFICER POPE: If that's
24 available now that would be great, if not, we can
25 make arrangements to receive that later.

1 supplemental to District Exhibit Number 4, then.
2 That's an appropriate way to handle that.

3 Let me ask if there's other loose ends related
4 to exhibits? Have all of the exhibits that have
5 been tendered been admitted? I have one other loose
6 end that I want to raise, but do the parties believe
7 that all exhibits from the city and from the
8 district as well those that were provided by the DWR
9 have now been acted upon and admitted?

10 This was a question Mr. Rolfs has raised, and
11 I had a similar one. I understand that the Power
12 Point presentations were used to assist with
13 testimony. Several of those have been provided, but
14 I know we have one from the USGS testimony that Andy
15 Ziegler provided. I think we have others that have
16 been provided from some of your witnesses. My
17 question I guess to counsel first before I act here
18 is if it would be possible to have a complete copy
19 of each of those as they were presented? I think
20 that will help just facilitate us going through this
21 material, since it's pretty voluminous, and that
22 the -- that might help with the record in terms of
23 digesting what was being said. Is there objection
24 to all of those being submitted or is there reason
25 why they can't be submitted? Maybe we already have

1 MR. LANG: I think it's on its way up to
2 you.

3 HEARING OFFICER POPE: Okay. Is there
4 a -- is there a preference in terms of whether
5 those -- how these be treated? They've not been
6 offered as exhibits, but --

7 MR. ADRIAN: With reverence.

8 HEARING OFFICER POPE: Just use these as
9 reference materials? I'm not sure whether to --

10 MR. ADRIAN: With reverence, yeah,
11 reverence.

12 HEARING OFFICER POPE: Okay. All right.
13 Thank you. Okay. With that, then, are there other
14 procedural questions before I ask if there are
15 closing comments, and among those, given the fact
16 that we had a public comment portion here this
17 evening, we did not provide for the normal
18 cross-examination of that purposely so because of
19 agreement of parties as well as -- as not wanting to
20 do anything that would discourage people from
21 participating in this proceeding.

22 Are there any loose ends or desire of the
23 parties to respond in any way to anything that's
24 been provided this evening? Okay. I see no
25 comment.

1 MR. LANG: Will the division make copies
2 of the letters from the public available to us or
3 can we get copies, I guess.

4 HEARING OFFICER POPE: We would be
5 willing and happy to make copies of all of the
6 written statements that have been provided if both
7 parties would like those, we'd be happy to do that.

8 MR. ADRIAN: We would, yes, we'd like
9 copies.

10 HEARING OFFICER POPE: Mr. Rolfs, would
11 you make a note on that. Okay. With that, let me
12 now turn to the applicant first, the city, and see
13 if you have some closing comments to make.

14 MR. LANG: City will waive its closing
15 comments. We feel the record is complete and we've
16 presented what we hope is the basis of making a
17 decision today.

18 HEARING OFFICER POPE: Okay. Thank you
19 very much. And the district?

20 MR. ADRIAN: We would likewise waive
21 closing argument.

22 HEARING OFFICER POPE: Okay. That's nice
23 and quick. Maybe it had something to do with the
24 hour. But I appreciate -- let me make a comment at
25 this point. I appreciate the diligence and the

1
2 CERTIFICATE
3

4 STATE OF KANSAS)
5) ss:
6 BUTLER COUNTY)

7 I, Michelle D. Hancock, a Certified Shorthand
8 Reporter within and for the State of Kansas, do hereby
9 certify that the foregoing is a full and correct
10 transcript of all the oral evidence and oral proceedings
11 had in this matter at the aforementioned time and place.

12 WITNESS my hand and official seal at Augusta,
13 Butler County, Kansas, this 8th day of February, 2005.
14

15
16 MICHELLE D. HANCOCK, CSR, RPR
17 Certified Shorthand Reporter
18 Registered Professional Reporter
19
20
21
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25

1 cooperative effort that the parties have shown in
2 terms of providing documentation so that we could
3 have an orderly proceeding, and one of my goals was
4 to make sure we gave everyone an opportunity to be
5 heard and to have a fair and complete, thorough
6 process. Hopefully we have achieved that goal, and
7 I mean that both from the standpoint of the parties
8 and your witnesses and the professionalism that has
9 been shown as well as the members of the general
10 public that are here and their participation.

11 With that, unless there's other questions, I
12 will close the hearing subject to keeping the record
13 open for purposes that have been so stated earlier,
14 and any unresolved issue that we need to deal with,
15 I reserve the right to contact the parties in that
16 regard; otherwise, we'll consider this matter
17 concluded and thank you very much. For the record,
18 it's about 9:05 p.m.

19 (End of proceedings.)
20 -----
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<p style="text-align: center;">A</p> <p>AA 26:21 27:7 abbreviated 237:23 able 7:7 16:12 51:14 84:9 143:20 149:23 171:16 200:8 237:11 246:1,15 262:1 350:12 373:5 375:16 about 5:12,17 8:21 9:1 13:24 15:12 20:20 21:25 23:9 27:10 37:11 39:22,23 40:4,6 40:17,18 41:2,16 47:18 49:9 50:12,14 50:17 54:4,6 59:3,3,7 59:7 60:1,21 62:5 63:13 67:8 68:7,14 69:25 76:16 77:5,22 77:22 78:5 80:13,16 80:21 83:23,25 86:10 88:21 94:12 95:6 99:23 107:6,15 122:15 129:24 134:1 139:11 152:13 156:10 156:17 160:13 161:15 161:21 162:12 166:21 167:18,24 173:23 177:6 180:20 181:4 183:7 184:6 190:3,20 191:1,2,3,12 193:14 194:18 195:7,15 196:15 197:10 201:16 210:14 215:9,24 216:4,9 218:12,25 219:21 222:4,13,24 223:4,11 245:7,18 247:21 250:20 255:18 261:10,16 262:2,22 263:3 266:17,24 274:8,12,15 275:11 275:12 276:4 277:22 280:13 285:18 287:7 288:6 289:21 290:15 290:15 292:15 297:23 303:8 307:9 308:2 313:5 314:8,20 315:15 317:14 320:24 321:6 323:14 324:12 324:12 325:9,13 328:17 332:8 336:2 342:17,17 344:15,17 347:8,18 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