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Deposition Transcript of:  
Richard Allen, P.E.

Date: February 19, 2013

Case: State of MT v. State of WY

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No. 137, Original  <hr/> IN THE SUPREME COURT OF THE UNITED STATES  <hr/> STATE OF MONTANA, Plaintiff v. STATE OF WYOMING and STATE OF NORTH DAKOTA, Defendants  <hr/> BEFORE THE HONORABLE BARTON H. THOMPSON, JR. SPECIAL MASTER  <hr/> DEPOSITION OF RICHARD G. ALLEN, P.E. February 19, 2013  <hr/> <p>Pursuant to Notice and the Federal Rules of Civil Procedure, the deposition of RICHARD G. ALLEN, P.E., taken by the Defendants, was held at 6890 Tower Road, Denver, Colorado 80249 on February 19, 2013 at 8:06 a.m., before Kirsten M. Thorngate, Registered Professional Reporter and Notary Public for the State of Colorado.</p>	INDEX  EXAMINATION By Mr. Draper By Mr. Brown  REQUESTED PORTIONS OF TESTIMONY  Document production  Marked at counsel's request  Certified questions  EXHIBITS MARKED 256 Notice of Deposition Duces Tecum 257 Allen expert report, 1/4/13 258 Redacted pages from Book's report 259 Padlock Ranch aerial photograph with METRIC 260 Taylor aerial photograph with METRIC 261 Lomax aerial photograph with METRIC 262 Wilson aerial photograph with METRIC (Attached to original and copy transcripts, via hard copy and/or .pdf as requested by counsel.)  PREVIOUSLY MARKED PAGE                      PREVIOUSLY MARKED PAGE (None.)
2	4
APPEARANCES For the Plaintiff: JOHN B. DRAPER, ESQ. Montgomery & Andrews 325 Paseo de Peralta P.O. Box 2307 Santa Fe, New Mexico 87504-2307  For the Defendant State of Wyoming: CHRISTOPHER BROWN, ESQ. Attorney General's Office Water & Natural Resources Division 123 Capitol Building Cheyenne, Wyoming 82002  Also Present: Dale Book Willem Schreuder	1           (Whereupon, the within proceedings were taken 2 pursuant to the Federal Rules of Civil Procedure:) 3           (Exhibit 256 was marked.) 4           RICHARD G. ALLEN, P.E., 5 having been first duly sworn to state the whole truth, was 6 examined and testified as follows: 7           EXAMINATION 8 BY MR. BROWN: 9       Q Good morning, Dr. Allen. 10       A Good morning. 11       Q My name is Chris Brown. I'm an attorney with the 12 State of Wyoming, and we're here to take your deposition 13 with regard to the expert report that you filed in this 14 case dated January 4, 2013. Could you please state your 15 full name for the record. 16       A Yes. Richard Glen Allen. 17       Q And have you had your deposition taken before? 18       A Yes. 19       Q Do you see any need for me to go through the 20 rules of deposition or can we just plow forward? 21       A It might be helpful. 22       Q Generally, anytime you need to take a break, let 23 me know. We can certainly take a break. I know John is 24 fond of taking a break every hour. I'm not. I tend to 25 plow forward. So if anybody needs a break, just let me

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1 Q And does it target specifically calibration to  
 2 base flows of the Snake River?  
 3 A Well, you would have to define "base flow."  
 4 Q Base flow -- I guess generally my understanding  
 5 is flow attributable to groundwater.  
 6 A Yes.  
 7 Q If you look at page 2 of your report that we're  
 8 still on, I guess, right under the introduction we get  
 9 into just generally, I guess, the beginning of the  
 10 description with regard to what you were tasked with in  
 11 this case, and I'm wondering if you can just tell me  
 12 generally what it is you were asked to do.  
 13 A I was asked to sample monthly and growing-season  
 14 evapotranspiration for years 2004 and 2006 for irrigated  
 15 areas in Wyoming lying in the Tongue River Basin.  
 16 Q And how was it you were -- how was it you went  
 17 about doing that?  
 18 A I received field polygons, which are defined as  
 19 outlines of irrigated fields. These were in an  
 20 ArcGIS-type format. These polygons which numbered in the  
 21 thousands had -- were provided by Spronk Water Engineers.  
 22 I used ArcGIS where I imported the monthly and  
 23 growing-season evapotranspiration files that had been  
 24 created using METRIC by the University of Idaho. I used a  
 25 zonal statistics tool within ArcGIS that provided a

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1 parcel-average evapotranspiration on a monthly and  
 2 growing-season basis.  
 3 I also calculated what we refer to as ETrF, which  
 4 is essentially synonymous with the crop coefficient. I  
 5 also calculated those by dividing the ET by the referenced  
 6 evapotranspiration that had been used in the original  
 7 METRIC application.  
 8 Q Do you have any understanding of why years 2004  
 9 and 2006 were the only years you were tasked with?  
 10 A My understanding is that those were relatively  
 11 low-flow years.  
 12 Q Were you asked to conduct a METRIC analysis of  
 13 any other year?  
 14 A No.  
 15 Q Could you have engaged in the same type of  
 16 analysis for any year in the 2000s?  
 17 A I can't answer that. I would have to study the  
 18 availability of cloud-free images to --  
 19 Q Okay. Assuming for any year in the 2000s there  
 20 were sufficient cloud-free images for you to do an  
 21 analysis, would you be able to do the same type of  
 22 analysis?  
 23 A Yes. If there were sufficient series of  
 24 images -- they don't have to be completely cloud-free, but  
 25 relatively cloud-free so that we could determine ET for

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1 the April-through-October growing period, yes, we could  
 2 apply METRIC to any year in 2000.  
 3 Q How about earlier? What's the furthest back you  
 4 can go and do a METRIC analysis?  
 5 A Generally the first year for METRIC is 1984.  
 6 Q That's when Landsat 5 was launched; is that  
 7 right?  
 8 A Yes.  
 9 Q And so you could have -- assume that there were  
 10 sufficient number of cloud-free images, you could have  
 11 performed the same type of analysis for 1987, 1988 and  
 12 1989, right?  
 13 A Most likely. That would also depend upon the  
 14 availability of weather data.  
 15 Q Sure.  
 16 A We like to have as high of quality weather data  
 17 as possible to calibrate METRIC, and that includes hourly  
 18 weather data. In the 2004, 2006 applications, we used  
 19 weather data from the Sheridan, Buffalo and Gillette  
 20 airports. I do not know whether that type of data would  
 21 be available for the 1980s.  
 22 Q Okay. You weren't asked to perform an analysis  
 23 for those years, anyway?  
 24 A No.  
 25 Q You had mentioned with regard to -- I think it

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1 was right after you were reading a portion of your report  
 2 that comes under the introduction section that you were  
 3 provided ArcGIS-based irrigated field polygons by Spronk  
 4 Water Engineers. Do you know if those polygons are  
 5 provided in the material that you gave us today?  
 6 A Yes. They are.  
 7 Q Okay.  
 8 A And I believe they were provided earlier as well.  
 9 Q Okay. It could be. I haven't myself tried to  
 10 dig through all that. And then you mentioned that you  
 11 imported the polygons on to monthly and seasonal METRIC  
 12 images; is that right?  
 13 A Well, I would say it a little bit differently. I  
 14 imported the METRIC images into Arc and imported the  
 15 shapefiles, is what they're called, that identify those  
 16 polygons --  
 17 Q Okay.  
 18 A -- into Arc.  
 19 Q And then you used a Zonal Statistics tool to  
 20 figure out a parcel average ET rate; is that right?  
 21 A Yes.  
 22 Q Describe to me how that works.  
 23 A Well, there are various ways to sample  
 24 information. In ArcGIS, Zonal Statistics tool, just as  
 25 the name applies, calculates various statistics including

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1 A No. Well, let me rephrase that. Generally not,  
 2 although sometimes it becomes fairly visible that there  
 3 may have been an irrigation event if you see part of a  
 4 field that has higher ET than another part. You can  
 5 sometimes see evidence of irrigation, but there's no way  
 6 of knowing that it's irrigated because of irrigation.  
 7 Q Let me give you an example. And in this case, I  
 8 assume you're aware that the doctrine of prior  
 9 appropriation is applicable?  
 10 A Right.  
 11 Q And so in my example, let's assume that a  
 12 particular field was entitled under the doctrine of  
 13 appropriation to receive irrigation water, say, on May 18.  
 14 Could METRIC determine whether or not -- well, let me back  
 15 up. And then on May 19, it may not have been entitled to  
 16 receive water. Could METRIC determine whether it was  
 17 receiving water on May 19?  
 18 A No.  
 19 Q My understanding is, is that the ET that results  
 20 from irrigation water can sometimes be reflected for weeks  
 21 after that irrigation water is applied.  
 22 A Yes.  
 23 Q With regard to the parcels that you supplied  
 24 actual ET estimates for to Mr. Book, do you have an  
 25 opinion with regard to when those parcels received

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1 irrigation water?  
 2 A No. Not without studying the data.  
 3 Q And what data would you have to study to  
 4 determine when they received irrigation water?  
 5 A Well, I would study the monthly ETrF values by  
 6 parcel and compare those amongst other parcels to look at  
 7 the relative amount of ET.  
 8 Q So you might be able to determine if it received  
 9 water in one month as opposed to another?  
 10 A I think that would provide some indication.  
 11 Q And how precise could you be with regard to when  
 12 exactly that field received water?  
 13 A Oh, I don't think there would be a high level of  
 14 precision.  
 15 Q By using METRIC, can you determine the source of  
 16 the irrigation water?  
 17 A No.  
 18 Q Can it distinguish between surface sources or  
 19 groundwater or subsurface sources or storage water?  
 20 A No.  
 21 Q And with regard to any of the parcels that you  
 22 provided actual ET estimates to Mr. Book, do you have an  
 23 opinion with regard to the source of the water for --  
 24 A No.  
 25 Q -- any of those parcels?

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1 A No.  
 2 Q You knew the answer before I finished asking.  
 3 (Exhibit 258 was marked.)  
 4 Q Showing you what's been marked as Exhibit 258,  
 5 Mr. Book might recognize that. And what I have just given  
 6 you is several pages from Mr. Book's report that he  
 7 provided in this case, and basically what I've done is  
 8 extract those portions of his report that I found  
 9 referenced the METRIC analysis, okay? Have you ever seen  
 10 any of these pages before?  
 11 A Yes. I've briefly reviewed Mr. Book's report at  
 12 the time of submittal.  
 13 Q Okay. And I think we've talked a little bit  
 14 today about what you provided to Mr. Book for use in his  
 15 report. And he indicates under the 3.2 METRIC Analysis  
 16 paragraph that "The results -- and referring to the METRIC  
 17 results -- "are available to overlay on GIS mapping of  
 18 irrigated area polygons from which the average ET rate can  
 19 be derived." Do you see that?  
 20 A Yes.  
 21 Q Now, is it my understanding from your testimony  
 22 today that you're the one that actually derived the ET  
 23 rates for the polygons he provided?  
 24 A Yes.  
 25 Q Okay. And you did that using the

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1 computer-averaging program that we talked about earlier.  
 2 I forget the name.  
 3 A Yes. It's probably better described as a tool  
 4 within ArcGIS called a Zonal Statistics tool.  
 5 Q Okay. And then he goes on to say that "This  
 6 information was used to aid in the interpretation of  
 7 aerial photographs to determine the status of irrigation  
 8 in 2006." Did you have any involvement with  
 9 interpretation of aerial photographs?  
 10 A No.  
 11 Q And he only mentions 2006 here, but did you also  
 12 provide actually ET estimates for the polygons for year  
 13 2004?  
 14 A Yes.  
 15 Q Further down he states in that same paragraph  
 16 that "Dr. Allen developed a background ET rate from a set  
 17 of polygons, which has been used in this analysis to  
 18 estimate net ET, the ET attributed to irrigation supply."  
 19 And to your understanding, is the background ET that he  
 20 discusses here the same background ET that we talked about  
 21 earlier?  
 22 A Yes.  
 23 Q That was generally developed by you through  
 24 averaging of rangeland units that you had selected?  
 25 A Yes.

REPORTER CERTIFICATE  
I, KIRSTEN M. THORNGATE, Registered Professional  
Reporter, appointed to take the deposition of

RICHARD G. ALLEN, P.E.,

certify that prior to the deposition the witness was sworn  
by me to tell the truth; that the deposition was taken by  
me at 6890 Tower Road, Denver, Colorado 80249 on February  
19, 2013.

I certify that the proceedings were reduced to  
typewritten form by computer-aided transcription  
consisting of 158 pages herein; that the foregoing is an  
accurate transcript of the proceedings.

I certify that I am not related to, employed by,  
of counsel to any party or attorney herein, nor interested  
in the outcome of this litigation.

I further certify review of the transcript was  
requested.

Attested to by me this 26th day of February,  
2013.

\_\_\_\_\_  
KIRSTEN M. THORNGATE, RPR  
Coffman Reporting  
& Litigation Support, Inc.  
Commission expires 11/16/16

Re: State of Montana v. State of Wyoming  
Trial Date: Not set  
Volume: --  
Proofer: BAM

February 26, 2013

JOHN B. DRAPER, ESQ.  
Montgomery & Andrews  
325 Paseo de Peralta  
P.O. Box 2307  
Santa Fe, New Mexico 87504-2307

Re: State of Montana v. State of Wyoming  
Deposition of: RICHARD G. ALLEN, P.E.  
Date Taken: February 19, 2013  
Trial Date: Not set

Dear Mr. Draper:

Enclosed is your copy of the deposition of Mr. Allen.  
Thank you for offering to handle signature. After having  
the transcript signed and notarized with any correction  
sheets, if required, please return the originals to us.  
We will seal them for attachment to the original  
transcript and send copies to other counsel in this  
matter.

This should be accomplished no later than April 2, 2013  
pursuant to the Federal Rules of Civil Procedure.  
Thank you for allowing us to be of service. If you need  
any further assistance, please contact us.

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1440 Blake Street, Suite 320  
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RICHARD G. ALLEN, P.E. STATEMENT OF CHANGES  
State of Montana v. State of Wyoming  
Date: February 19, 2013 Trial: Not set  
I, RICHARD G. ALLEN, P.E., do hereby certify that  
I have read the foregoing transcript, and that said  
transcript, including any changes made below, constitute a  
true, accurate, and complete transcript of my testimony.

Page Line	Changes	Reason
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\_\_\_\_\_  
WITNESS

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_

\_\_\_\_\_  
Notary Public  
My commission expires \_\_\_\_\_  
Return to Coffman Reporting & Litigation Support, Inc.  
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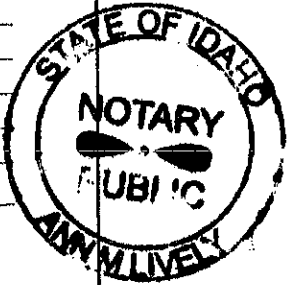
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transcript, including any changes made below, constitute a  
true, accurate, and complete transcript of my testimony.

Page	Line	Changes	Reason
14	13	'charge' to 'large'	typo
28	14	delete 'are'	
73	3	change 'it's' to 'lots'	
93	12	change 'dormant' to 'dormant'	
99	5	insert 'nearly' after 'often'	
109	11	ad 'ed' to 'water'	
120	11	change 'they' to 'lets'	
154	11	change '12' to '120'	

*[Signature]*  
WITNESS



Subscribed and sworn to before me this 19 day of  
March, 2013 *[Signature]*  
Notary Public  
My commission expires 2-09-16  
Return to Coffman Reporting & Litigation Support, Inc.  
1440 Blake Street, Suite 320, Denver, Colorado 80202