

BEAR RIVER COMPACT COMMISSION

Transcript
of
Meeting
held
December 2 and 3, 1954

Governor's Board Room
State Capitol
Salt Lake City
Utah

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P.M. Session 143

BEAR RIVER COMPACT COMMISSION

FEDERAL REPRESENTATIVE and CHAIRMAN:

E. O. Larson Regional Director, Region 4
Bureau of Reclamation,
Salt Lake City, Utah

COMMISSIONER FOR THE STATE OF IDAHO:

Fred M. Cooper Chairman, Idaho Compact Commission,
Grace, Idaho

COMMISSIONER FOR THE STATE OF UTAH:

George D. Clyde Director, Utah Water and Power Board,
Salt Lake City, Utah

Ashby D. Boyle	Utah-Idaho Sugar Company, Salt Lake City, Utah
J. A. Wood	Utah-Idaho Sugar Company, Salt Lake City, Utah
Ford F. Scalley	Utah-Idaho Sugar Company, Garland, Utah.
C. O. Roskelley	Engineer, Utah-Idaho Sugar Company, Salt Lake City, Utah.
E. G. Thorum	Engineer, Utah Power and Light Co., Salt Lake City, Utah.
Wilford M. Burton	Deseret Livestock Company, Salt Lake City, Utah.
J. L. Weidmann	R.D. 1, Honeyville, Utah
Alonzo Hopkins	Woodruff, Utah
L. B. Johnson	Randolph, Utah
John P. Stevens	Utah Water and Power Board, Henefer, Utah.
E. M. Van Orden	Lewiston, Utah
Elmer Woodruff	Tremonton, Utah
Ieland Woodruff	Tremonton, Utah
A. V. Smoot	Corinne, Utah
Harry Drew	Tremonton, Utah
Lawrence Carter	Garland, Utah
* C. R. Nate	2336 E. 3400 S., Salt Lake City, Utah.

WYOMING:

Howard B. Black	Attorney General, Cheyenne, Wyoming
H. T. Person	Dean of School of Engineering, University of Wyoming, Laramie, Wyoming.
Fred B. Myers	Evanston, Wyoming

*Com. Cooper introduced Mr. Nate as an Idaho adviser. (See page 6.)

S. Reed Dayton	Cokeville, Wyoming
Emil C. Gradert	Fort Bridger, Wyoming
Arden Pope	Sage, Wyoming
David P. Miller	Rock Springs, Wyoming

BUREAU OF RECLAMATION:

E. K. Thomas	Area Engineer, Logan, Utah.
Reid Jerman	Regional Office, Salt Lake City, Utah.

U. S. GEOLOGICAL SURVEY:

W. N. Jibson	Hydraulic Engineer, Logan, Utah.
W. V. Iorns	Engineer, Tulsa, Oklahoma.
M. T. Wilson	Salt Lake City, Utah.
Thomas R. Newell	Boise, Idaho
Albert B. Harris	Logan, Utah

FISH AND WILDLIFE SERVICE:

F. V. Olson	Albuquerque, New Mexico
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PROCEEDINGS

The Meeting was called to order by Mr. E. O. Larson, the Chairman, at 10:50 o'clock a.m., on Thursday, December 2, 1954, in the Governor's Board Room in the State Capitol, Salt Lake City, Utah.

THE CHAIRMAN: The meeting will come to order. Mr. Bishop says if we are a little put out this morning, we can sue the Union Pacific for being late.

(Notice submitted for the record reads as follows:)

"BEAR RIVER COMPACT COMMISSION
Post Office Box 360
Salt Lake City 10, Utah

November 2, 1954

Notice of Meeting of
Bear River Compact Commission

The next meeting of the Bear River Compact Commission, originally set for November 15 and 16, has been postponed to December 2 and 3, 1954. The meeting will be held in the Governor's Board Room, State Capitol, Salt Lake City, and the first session will start at 9 a.m.

The minutes of the meeting of September 28 and 29, 1954, have been transcribed and copies will be sent to the Commissioners and their advisers well in advance of the next meeting.

(Signed) E. O. Larson
Chairman."

COM. BISHOP: Mr. Chairman, if we are ready to go, I see you have an outline here that looks pretty good to me. I am going to move that we adopt it.

THE CHAIRMAN: I would like to read it.

COM. BISHOP: All right, you read it and then I will make a motion.

THE CHAIRMAN: I believe we have now reached a point after several years where we have fully covered the investigation of the Bear River System and considered a lot of facts and figures; and it should be down now to the place where the provisions of the Company either should be reached or it should be decided they can't be reached. With that in mind I have prepared an agenda this morning. Also as

Chairman, I would like to make a suggestion as to the procedure to be adopted at this meeting.

For those who do not have copies of the agenda I would like to read it:

1. A statement by the Compact Commissioner of each state as to representation at the meeting.

2. A statement by the Chairman on suggested procedure for the meeting.

3. Consideration of the minutes of the previous meeting.

We have not yet approved the minutes of the meeting of September 28 and 29, 1954, November 7, 1952, and October 16, 1952.

4. Report on allocation of direct flow by Mr. Jibson. That was requested at the last meeting of the Commission.

5. A discussion of Mr. Jibson's report.

6. A report by Mr. Thomas of the Bureau of Reclamation on estimated effects of upstream storage on lower rights. That was requested at the last meeting.

7. A discussion of his report.

8. A statement by the Chairman of problems to be considered in connection with upstream storage.

9. A break up at that point into caucuses, if that is deemed desirable.

10. The report of the Legal Committee if we make progress in the caucuses.

11. Review of the draft of Compact article by article if we make progress up to that point.

COM. BISHOP: Mr. Chairman, I move that we adopt this agenda to be followed by this meeting to expedite the work.

COM. COOPER: Mr. Chairman, I will second Mr. Bishop's motion.

THE CHAIRMAN: It has been moved and seconded that this agenda be adopted. (Thereupon a vote was taken and Com. Bishop's motion carried unanimously.)

First, then, alphabetically, Idaho, will you name your representation at this meeting?

COM. COOPER: Mr. Merrill is our legal adviser. Mr. Graydon Smith, Attorney General-Elect, is our legal adviser. Mr. Russell Stoker is our engineer and commissioner on the Bear River District No. 5. Mr. Kulp is our Reclamation Engineer. Mr. Thomas Newell represents the U.S.G.S. Mr. Serrine is our Compact adviser. And Mr. Charles Nate is a Compact adviser. The gentlemen are all here.

THE CHAIRMAN: Utah.

COM. CLYDE: Mr. Bob Porter representing the Attorney General is our legal adviser. Mr. Jay Bingham, engineering adviser. Mr. Tracy-- I don't see him but he is supposed to be here--he is an engineering adviser. Mr. Stevens of the Water and Power Board. Mr. Orson Christensen of the Water and Power Board. Mr. J. L. Weidmann from the lower river. Mr. Smoot from the lower river. Mr. Van Orden from the middle river. Mr. Lawrence Johnson from the upper river. Mr. Hopkins is not here.

MR. JOHNSON: He is in town and he will be here I think.

COM. CLYDE: I believe that is all the representation from Utah. Oh yes, Mr. Orville Lee of the Water and Power Board.

THE CHAIRMAN: Wyoming.

COM. BISHOP: Mr. Chairman, first I want to introduce our Attorney General, Mr. Howard Black, our legal adviser. Will you stand up each one of you gentlemen; I want to be sure each one knows who you are. H. T. Person, engineering adviser. And Mr. Spaulding, is he here any place?

A VOICE: He is in town but he hasn't shown up.

COM. BISHOP: I will have to introduce him later. Dave Miller, a member of our Commission. Emil Gradert, a member of our Commission. Arden Pope, a member of our Commission. I believe that is all that we have.

THE CHAIRMAN: If there is anyone who hasn't signed the record here of attendance we would like them to do so.

This meeting is a little different in this respect, that it was thought by the Commissioners it would be an important meeting, one of the most important meetings we have ever had, and we should have a transcript of it; so we have Mrs. Lois Crowder with us this morning, who, incidentally, I should say, is an expert on taking testimony in compact commissions. She has been taking them for the Upper Colorado River Compact Commission and the Upper Colorado River Commission for I don't know how long. So we will have to watch it and see that we conduct the meeting in such a way that she gets all the names and statements made.

Now in order to save time and make a better record of the proceedings, I have the following suggestions to make:

1. That questions on reports, these reports given by Mr. Jibson and Mr. Thomas, be postponed until the presentation of each of these gentlemen has been completed. Then if you have questions, they can be answered at that time.

2. That motions and statements on behalf of the states shall be made by the Compact Commissioners and Assistant Commissioners. That doesn't mean that there won't be statements from the floor; but if they represent the state, I would suggest that they be made by the Compact Commissioners or the Assistant Commissioners that they may name.

3. That caucuses shall be held upon matters of a technical nature and upon problems concerning only two states, or otherwise as deemed advisable in case three states want to get together. But as we proceed later on after the reports, I will mention the problems to be considered under Item 8 of the agenda.

So what do you want to do with the suggested procedure? Do you want to adopt that procedure?

COM. COOPER: I move we follow the procedure as it has been suggested by the Chairman.

COM. BISHOP: I second the motion.

THE CHAIRMAN: It has been moved and seconded these procedures be followed. (Thereupon a vote was taken and Com. Cooper's motion carried unanimously.)

THE CHAIRMAN: The minutes of the last meeting I believe were sent out by the Secretary two or three weeks ago.

MR. SKEEN: Yes.

THE CHAIRMAN: I hope you have read them.

COM. BISHOP: Mr. Chairman, Wyoming has read the minutes of these several previous meetings you mentioned. In order to expedite our work, I move that the minutes be approved.

THE CHAIRMAN: That includes the minutes of September 28 and 29, 1954; the minutes of November 7, 1952; and the minutes of

October 16, 1952. Those are the three sets of minutes that have not been acted upon. You have heard the motion.

MR. SKEEN: Mr. Chairman, before a vote is taken on that I would like to call attention to a typographical error on page 21 of the minutes of September 28 and 29. At the top of the page in three places it should read, "November 7, 1952" instead of "1953."

COM. COOPER: Page 21?

MR. SKEEN: That is on page 21. And those errors appear in the first line, the third line and the fourth line.

COM. BISHOP: I amend my motion to include the correction.

THE CHAIRMAN: Are the other states ready to act?

COM. COOPER: I am ready to second Mr. Bishop's motion. We have gone over them also.

THE CHAIRMAN: It has been moved by Mr. Bishop and seconded by Mr. Cooper that the minutes of the three previous meetings be approved. (Thereupon a vote was taken and Com. Bishop's motion carried unanimously.)

The next item then on the agenda will be the report of Mr. Jibson on the allocation of direct flow. And again, if you have any questions, if you will keep track of them until Mr. Jibson is through, that will give him an opportunity to go right on through with his report and answer questions when he has completed.

MR. JIBSON: I will need someone to help hand out this bunch again. (Copies of Report No. 28 are distributed.) Also, I have a new index of reports made up.

THE CHAIRMAN: Before you start, Mr. Jibson, do we need to make a transcript of your remarks, or will you stay close to the report and we can simply use the report?

MR. JIBSON: I mentioned to our stenographer here that if she would follow me in the report, I have some off-the-cuff remarks occasionally to make, and she can tell when I am making those. Otherwise, she can copy them directly out of the report. I believe if she follows right through with the report she can do that very easily.

MR. IORNS: In the distribution of these have you got sufficient copies for everyone in the room?

MR. JIBSON: Yes, there should be plenty of copies for everyone. A few have picked up their copies. I have also prepared up-to-date indexes of all these reports, which we might hand out. (Document distributed.)

REP. #
28

I am sorry that I wasn't able to get this report distributed a week or so ago. We did have two weeks' grace on this meeting; but I had two preliminary meetings to prepare for and I found that we had to get out a lot of basic information which was necessary for Mr. Thomas to complete his study, and this extra time we were given just about took care of that. It is a good thing we were postponed a couple of weeks or I would have been in dire straits on the report. I just got it finished a couple of days ago and bound.

As requested by the Commission, my phase of this study deals entirely with the division of the direct flow or natural flow, as we have sometimes called it, under compact operation. Because of this, the report consists almost entirely of graphs. It is very difficult, as you will see, to summarize that kind of a finding into something that we can glance at and see the picture immediately.

I might say in addition to that, that in order to avoid an extremely bulky report, all of the daily tabulations which were necessary to complete this graphical analysis were left out and are being held in the Logan office as basic data. Now anyone who might be concerned with the daily tabulations of water flows and of compact allocations for a study of their own or any other purpose, can get those immediately from the Logan office. It would have taken another 65 sheets of tables alone, in addition to this bunch of graphs, to have included those in the report.

The manuscript portion of the report is more or less a summary of findings as nearly as I could summarize it. It isn't extremely long, and I believe we can read it through together and get more out of it that ways perhaps than just talking about it.

"This report consists essentially of an application of the natural or direct flow provisions of the present draft of the Bear River Compact to all land above Bear Lake.

It comprises a hydrographic analysis and a summary of the effects of Compact regulation in each section of the Upper and Central Divisions for years in which diversion records were collected. These records were obtained in 1944-47, 1953 and 1954 in both Divisions and in addition in 1948 in the Central Division."

That gives us six years of record in the Upper Division and seven years of record in the Central Division which we can use as a basis for studying direct flow allocation.

"A study of the pattern and magnitude of irrigation season flows passing the Evanston gaging station for the past 30 years indicates that no individual year in the above group would constitute a good index of average supplies and diversions. Actually, several extremes are represented. For instance, in 1945 and 1947 the month of June was among the coldest and wettest on record. Deficient supplies in 1954, especially in the Upper Division, define it with the lower three or four years of the past 30. Consequently, it would be of little value to analyze Compact regulation from a standpoint of an average effect during the years of record. A better picture of compact operation can be obtained from a study of the individual hydrographs comprising the bulk of this report."

And I would like to emphasize that again. I attempted several different types of summaries to see if I could present a picture that was quickly and easily grasped without studying each hydrograph, but it is so complex that to see the whole thing in summary form is misleading to say the least. It is a case of looking over the hydrographs for the individual years and the individual sections and seeing what happens each year. I have attempted to summarize it as much as possible.

Now we will discuss the Upper Division first:

"A brief summary of regulation in the three major sections of this Division would include the following:--"
I say "three major sections" although we are concerned with four sections, one of which has very little significance as far as irrigated land or diversions are concerned; that is the Upper Utah Section, which actually only includes the diversion under the Hovarka East Fork Canal and for land on Mill Creek. The three major sections which I am talking about would be the Upper Wyoming Section, extending from the state line above Evanston down to Woodruff Narrows, and including those two diversions which divert at Woodruff Narrows in Wyoming, and the Francis Lee and Bear River canals which irrigate land in both Wyoming and Utah, but principally in Utah. And then the Lower Utah Section which takes from that point down to the state line below Randolph. And the Lower

Wyoming Section which actually includes the land under the B.Q. Dam and the Pixley Dam in the State of Wyoming, and no more.

"1. In most years initial regulation would be in effect for a few days early in May. Following high water the principal period of regulation would start between June 25 and July 10 and extend thru the balance of the season." I might explain when I say "regulation" here, I don't necessarily mean reduction in any particular section; but the regulation provisions would be in effect at that time. We will see the difference between regulation and reduction here as we go through the report.

"2. Initial regulation in May would have little, if any, significance. In general, only a portion of available water is being diverted at this time."

In extremely dry years that should be qualified. 1953 as a year was not extremely dry but as far as the month of May was concerned, it was a dry year. 1954 of course was a dry year throughout the season. In those two years, the initial regulation in May would be significant. But in average years and in the other years of record, that initial regulation which usually goes into effect the first part of May about eight or ten days would have little significance.

"3. In average years, a relatively small reduction in Upper Wyoming diversions would be necessary from the

beginning of the principal regulation period and extending past the middle of July. This reduction might be estimated near 10% of diversions for a period of two or three weeks in years of average supplies.

4. In 1954 regulation would have been in effect throughout the entire season except about 2 weeks in the middle of May. During June and July the reduction in Upper Wyoming would have averaged 29% of diversions.

5. In most years under present irrigation practices diversions in Lower Wyoming would cease prior to the principal Compact regulation period."

We will explain that as we look at the graphs a little further. Then maybe to summarize in a fewer words than that our direct flow regulation in the Upper Division, we might say that in better than average years reduction in any sense would be relatively minor; in average years we will have a reduction which may be as much as 10% for about 2 weeks after regulation goes into effect and prior to the middle of July; in years below average and in dry years, the amount of reduction will range from 10% to up to 30% in terms of total diversions in the Upper Wyoming Section of the Upper Division.

"In order to analyze Compact operation in the Upper Division it was necessary to compute the daily flow passing Pixley Dam for the 1944-47 irrigation seasons during which the discharge was not gaged. This computation was made by

correlation with the water passing Bear River near Randolph gaging station minus the diversions at B.Q. and Pixley Dams. The curve of relationship was developed from 1953 and 1954 records of Bear River below Pixley Dam. This relationship is well defined and should result in a reliable computed record within the limits necessary for this study."

I believe that is the only instance in which I have had to use a computed record rather than an actual measured record in arriving at the results of the study. In 1953 and 1954 we did have records of the water passing Pixley Dam and by correlating that flow with the flow passing this gaging station, minus the diversions below, we get a curve of relationship which shows a small amount of gain in addition to that, and we can extend it back through the early years of diversion records and get a usable record from it.

"Plates 1 to 12 show hydrographs of actual diversions and corresponding Compact operation data in the four sections comprising the Upper Division, while Table I summarizes chronologically the seasonal quantities."

We will go to those graphs in just a moment.

"It is to be noted that in several years there is either an increase or no effect shown in each of the three principal sections by reason of Compact regulation. This is due to the provision whereby section allocations are a percentage of the total diversions plus the flow leaving

the Division. The latter quantity is the flow passing Pixley Dam and as can be seen on plates 7 to 12 is rather sizeable in many years.

Total seasonal allowable diversions under Compact operation, as summarized in Table I, have little significance except in instances where reduction extends through most of the season (Upper Wyoming, 1954). In most other years increased allocations during August and September when the demand is of relatively minor importance, tends to offset reductions during the more critical portion of the regulation period. Likewise, increased allowable diversions in a section are made up in part by water leaving the Division. It is physically impossible to take all of this flow upstream because a part is developed in the lower end of the Division." In other words, the magnitude of reduction in a section is more important than the corresponding increase in a lower section in studying these graphs because the corresponding increase is greater in nearly all cases by reason of these facts I have mentioned. We should keep that in mind as we study particularly the two tables that I have prepared, summary tables, and not be misled by the large increases in lower sections, except in these dry years when we have a regulation throughout most of the season; then they show a fairly accurate picture of the seasonal regulation.

"In average and better years the physical distribution probably limits total utilization in the various sections. In low years such as 1954 the flow passing Pixley was negligible, indicating that total utilization was possible."

Now you will recall under the provisions of the Compact that we take the total diversions in Upper Utah, the total diversions in Upper Wyoming, the total diversions in Lower Utah, and the total diversions in Lower Wyoming, and we add to that figure the water leaving the Division. Then we divide that up by percentages to allocations in each of the sections. We also have a provision in the Compact which states that if any section is not using its total allocation, that allocation will be divided among the other sections insofar as it is practicable.

Now we have several years during this period of diversion in which we have considerable water leaving the Division. We also have a situation in Lower Wyoming in which they dry up their canals voluntarily, usually from about the 3rd of July to about the 10th. After they dry up, I have recomputed the percentages to give it to the other three Divisions. At a little later period this one canal in Upper Utah dries up voluntarily. And so we end up with a percentage which adds up to a hundred percent of the diversion between Upper Wyoming and Lower Utah. As a result that tends, particularly in Lower Utah, to show quite large increases by reason of Compact opera-

tion; and for the same year and the same time, we will see a much smaller corresponding reduction in Upper Wyoming. The important thing of course is to study the reduction.

In the first place we know that it is physically impossible to take all this water back upstream. There is a small amount of water developed below the last diversion in Utah, the B.Q. West Side Canal. We have some return flows from the diversion at B.Q. Dam getting back in, all of which can be diverted at Pixley Dam up to the limit, of course, of their capacity, but none of which could be taken back upstream. We also have a large natural gain in the entire Utah Section. Its distribution would limit how much of it could be diverted in Utah, and of course none of it could be taken above Woodruff Narrows. All of these things we should keep in mind as we study the graphs and these summary tables.

Now Table I on page 4: I have listed the actual diversions from May 1st to September 30th, the acre-feet, and the acre-feet per acre, for each of the sections, chronologically by years of record in the Upper Division. This table has some value, I think, just from seeing the rates of diversions, keeping in mind that the figures in 1954 are from June 1st, not from May 1st, because we didn't have diversion records.

And then over on the right side of the table I have called it "Compact Operation", in which I show the dates of regulation, the allowable diversions in acre-feet, and the

acre-feet per acre. This is on a seasonal basis again except in 1954 where it is on the four months.

Now I believe if we go to Plate 1 and briefly look over Plates 1 to 6--incidentally on these plates, it was necessary to put only two sections on each graph because having too many lines on the graph, it would be difficult to read. So on the first six graphs I have plotted the data for Upper Utah and Upper Wyoming. Then on the graphs numbered from 7 to 12, I have plotted the same information for Lower Utah and Lower Wyoming plus the flow leaving the Division.

Now turning to Plate 1, the dashed line near the top, which runs off the page during the high water, is the total divertible flow, which is made up of the sum of all the diversions plus the water leaving the Division. The solid line below it is the actual Upper Wyoming diversions; and the small dashed line, in this case starting on July 9th, is the Upper Wyoming Compact allocation.

You will notice there that there was an initial period of regulation extending from May 1st to May 11th in that year, which gave Wyoming considerably more water than they were actually diverting; and on the basis of my previous statement that it has little significance, we know that to be a fact because there was a large amount of water passing Pixley Dam during that period, most of which could have been diverted in Upper Wyoming had they wanted it. Even though the Compact

would give them that large amount in the early part of May, it has very little significance. You will notice in this particular year that the Compact allocation would give Upper Wyoming more water than they actually diverted up to about July 18. The allocation then crosses over and gives a smaller amount until about the 28th of July, and then a larger amount throughout the season. Now this is one of the years that we would say that Compact regulation in Upper Wyoming has practically no significance. There is a very short period in which they would have reduction.

Upper Utah is such a small amount, down at the bottom of the graph, that it is difficult to show it graphically, because it is so small it does not have too much significance. I might say in general, however, that regulation would tend to cut that canal slightly during the regulation period in most years.

Turning over to Plate 2, it shows the same information for 1945, and again we have a picture that is somewhat similar to 1944. Only in the latter part of the season, as reflected by late season storms in that year, we have considerable more allocation than Wyoming was actually using or would have used. So 1945 is another year in which there is no significance to the regulation in Upper Wyoming.

In 1946 the picture is a little different. I made the statement earlier that there was no individual years which

would be considered a good index of average supplies in that area. However, if we take a combination of the 1944 and 1946 years as far as supplies are concerned, we hit a fairly good median figure. 1946 was below average as far as supplies were concerned. You will notice there that we do have regulation which amounts to about 100 second-feet at times out of a total diversion of something over 400. For the period from June 21st throughout most of July, throughout the balance of the season, the Compact allocation is actually greater than the diversions. Now I plotted the flow passing Pixley down at the lower part of that graph for that regulation period to show that in those lower-than-average years, the flow passing Pixley is not a great amount and we can utilize most of the water in the Division.

In 1947, Plate No. 4, we had another year something like 1945 with an extremely wet June and cold; and in the past we have not considered 1945 and 1947 as being representative at all in conducting these studies. We have regulation starting about July the 8th, with a reduction in Upper Wyoming coming about the middle of July and extending then until about the 13th of August. So we can see that 1947 is another year in which regulation would not have been significant at all.

In 1953 our regulation period starts July the 4th and we have an immediate reduction in that year in the allocation below their actual diversions. That reduction is rather sizeable

for the first 10 days or 2 weeks in July. And following that period, it is of not-too-large a quantity.

Then as we go to 1954, which in terms of supply gets progressively worse, we see what will happen in an extremely dry year, a year that we might consider as one of three or four out of 30. We did not have records in May, but judging from the supplies in that month, there would only be about 2 weeks during the middle part of the month that regulation would not have been in effect. We can see here that from the 1st of June and throughout what we might call the critical part of the irrigation season, through June and July, there would be considerable regulation in the Upper Wyoming Division. For the 2 months that regulation amounted to 29% of their total diversions. For periods during June it is much greater than that.

Now coming back to our Table I on page 4 and taking the years 1953 and 1954 as being much drier than average years, you will notice in the Upper Wyoming Section they diverted 1.8 acre-feet per acre in 1953 from June 1st through September 30th. Had we had the diversions in May that figure would have been somewhat higher. In 1954 they diverted 1.2.

On a seasonal basis, their 1953 diversion would only have been cut a tenth of an acre-foot per acre; but for the period during July, the cut would have been, of course, considerably more. And that is why I say that we should not be misled

by seasonal averages in studying this table. There is an instance there in which the picture is misleading. In 1954 they would have been cut to 0.9 acre-foot per acre.

Now going down to Lower Utah for those same years, they were able to divert 2.4 acre-feet per acre during the season. And in the case of Lower Utah, we did have records from the 1st of May, which gives us a 5-month period for Lower Utah. In 1954 they were cut to 0.5 acre-foot per acre from June 1st until September 30th; that would have been built up to 0.9 acre-foot per acre under Compact operation in the 1954 year. In other words, under Compact operation, Upper Wyoming and Lower Utah would have received about the same duty of water through the irrigation season.

Coming down to Lower Wyoming, let us turn over to Plate No. 7 in which the Lower Utah diversions and allocations and the Lower Wyoming diversions and allocations are plotted. You will notice that Lower Wyoming diversions shut off in that year on July the 7th, shut completely dry. Our Compact regulation went into effect in that year on July 9th. So we would have no effect one way or the other except in this early period in May, for 10 days in May, in Lower Wyoming.

You will notice that the Lower Utah allocation is considerably more than their diversions throughout most of the season; but at the same time, throughout July, there was considerable water passing Pixley Dam, most of which could

have been taken back upstream at least to certain canals in the Utah Section. This would indicate then that they could have been diverting more water in that regulation period than they were actually diverting. You will notice their tendency is similar to the Lower Wyoming tendency to decrease their diversions rapidly following the 1st of July.

Plate No. 8 is the same picture for 1945, in which the results are practically the same. Compact operation would not have affected the Lower Wyoming Section at all; it would have tended to increase Lower Utah diversions throughout the entire season.

Plate No. 9 shows the same information for 1946. Here by reason of regulation going into effect as early as June 21, we do have a Compact allocation in the Lower Wyoming Section. In this case you will notice that the flow passing Pixley is relatively small throughout most of the season, and you will recall that in 1946 Upper Wyoming was reduced a fairly large amount. So in a year like 1946, the Lower Utah allocation would have much more significance than in the previous year we have discussed.

Plate No. 10 shows the information for 1947, which is similar to 1945 again.

Plate No. 11 is for 1953. Here again Lower Wyoming would have some Compact allocation from July 4th to July 15th. It is doubtful under their irrigation practice where they were

cutting down voluntarily through that period, that they would have used the entire amount, but it does show a rather sizeable increase for them for that short period. The Lower Utah allocation again is much larger than their diversion throughout most of the irrigation season.

Then on Plate 12 we have the picture for 1954, our dry year. This is the same graph which we discussed at the last Commission meeting, showing the Lower Utah allocations and their diversions, and the Lower Wyoming diversions and allocations. You will notice here that Lower Wyoming did not shut dry here in July but continued some diversion throughout the season. This may be indicative of what they would do in dry years, that they would not follow their pattern of average years.

Lower Utah's Compact allocation, of course, is greater than their diversions for all but a couple of days throughout the entire irrigation season. It would be in the neighborhood of about 30% increase through the two months, and a considerably greater increase than that through the month of June.

Now if we save our consideration on these next plates until we get to the Central Division, I believe we will go right on down through the Central Division. On page 5:

"1. Regulation would have begun in most years early in July following the high water period."

We don't have in the Central Division as much of that initial regulation the first few days in May as we do in the Upper Division.

"2. In three years (1948, 1953, 1954) of the seven-year period of record, Wyoming diversions would have been reduced from the beginning of the regulation period throughout most of the irrigation season. The extent of these reductions is as follows: . . ."

In 1948 the total reduction in Wyoming--and I will interrupt here to point out the sections in the Central Division again. We have the Wyoming Section, which is land below Pixley Dam to Border, including Smiths Fork. We have the Idaho Section, which is the land from Border down to Stewart Dam. There are two states involved in the Central Division. The reduction would be in the Upper Section.

In 1948 we would have had a total reduction in that section of 6,000 acre-feet, which would amount to 0.35 acre-foot per acre. In 1953 we would have had 4600 acre-feet, amounting to 0.26 acre-foot per acre, plus or minus an undetermined amount in May. Without diversion records we don't know what their allocation would have been in May. It is likely that this reduction figure would have been increased somewhat for the month of May. And then in 1954 we have a total reduction of 27,000 acre-feet, which amounts to 1.56 acre-feet per acre.

While we are on that table, we turn over to page 6, our summary table in the Central Division, and we can look at that 1954 dry year for just a moment. You will notice that

Wyoming diverted 84,000 acre-feet from June the 1st to September 30th, or a total of 4.9 acre-feet per acre. After reduction under the Compact they would have had 3.3 acre-feet per acre in those 4 months in 1954. If we estimated a figure for May, that 3.3 acre-feet per acre would be increased to perhaps 4 under Compact operation.

Idaho in the same year diverted 3.1 acre-feet per acre. Incidentally, this is for the full five months in Idaho because we did have diversion records there. Their allowable diversions would have been 4.3 acre-feet per acre in that same year. In that particular year, the allowable diversions in Idaho are quite comparable to the reduction in Wyoming because there would be very little water leaving the Division.

Coming back to page 5 again:

"Regulation in Wyoming would have been relatively minor in the remaining four years of the period."

I should qualify that to say, "on a seasonal basis," because in 1946 for a period of about one month, from June 27th to July 27th, regulation in Wyoming would have amounted to about 6% of their total diversions. Under Compact operation, that would have been built up later in the season to such an extent that on a seasonal basis there was no significant reduction. But during the important month of July in 1946, there would have been about 6% reduction in total diversions.

"3. In each year of record both Sections in the Central Division have been initially restricted at the beginning of regulation to a maximum diversion rate of

one second-foot to 50 acres, which represents a reduction below percentage allocations. This initial allocation, usually in effect one or two weeks, is less than Wyoming diversions and greater than Idaho diversions in each year."

We will get a picture of that a little better as we look at the graphs in just a moment.

"4. Following high water the flow at Border drops below 400 second-feet in all years at an earlier date than the total divertible flow drops to 810 second-feet. The average period between these dates is 15 days."

You will recall that in our tentative draft, regulation goes into effect in the Central Division when either the flow at Border drops below 400 second-feet or the total divertible flow drops to 810 second-feet. In all the years of record the 400 second-feet criteria comes first; and in a dry year such as 1954, that is as much as 40 days earlier.

"Table II summarizes diversion and Compact operation data for the Central Division. Hydrographs for this Division are shown on plates 13 to 26. As in the Upper Division, large increases in allowable diversions have very little significance in most years because of relatively large flows leaving the Division. From this consideration, the magnitude of reduction in Wyoming is of greater importance than the much larger corresponding increase in Idaho. An exception is 1954 when the reduction and increase in the two sections are nearly equal due to decreased flow leaving the Division and a long period of regulation under the 1:50 limitation.

A study of supplies to the Central Division from June 15 to August 1 for the past 13 years (1942-54) indicates that 1945 and 1947 are above average, 1946, 1948 and 1954 below average, and 1944 and 1953 fairly well define average supplies for the six-week period."

This is not on a seasonal basis but on a period basis that we can say 1944 and 1953 are fairly near average.

Now let us turn over to the graphs covering that Central Division, which start with Plate No. 13. Here again as in the Upper Division, I found I had to prepare a graph for the Wyoming Section and another graph for the Idaho Section to keep from running too many lines into each other. So the first 7 graphs deal with the Wyoming Section of the Central Division and the last 7 graphs deal with the Idaho Section of the Central Division.

In 1944 you notice regulation goes into effect July 14th and extends throughout the season. For a period of about 10 days there we have reduction which amounts to about 10% of their total diversion; and then again in the period following the middle of August and throughout September, there is some reduction. But generally speaking, we would say that the 1944 year does not show an appreciable reduction in Wyoming in Central Division.

In 1945 on Plate 14 we have a picture again which is comparable to the Upper Division, in which the late season storms in August and September increased the supplies, increased the flow leaving the Division, and would give Wyoming a much greater allocation

than she was actually using at that time. Again we have a very short period initially in which Wyoming is reduced under the 1:50 limitation. You recall that the draft of Compact states that whenever the flow at Border is below 400 second-feet, no diversion shall exceed one second-foot to 50 acres. Now on a section basis, that tends to limit initially the diversions in Wyoming, and also in Idaho, as we will see later.

In Plate 15, the picture for 1946 shows that we do have some reduction in Wyoming for about one month. I roughly computed that amount of reduction this morning for the period and it amounts to ~~6%~~ of their diversions for the 30-day period. Following that, the Compact allocation actually increases their diversions and has little significance throughout the remainder of the irrigation season.

In 1947, again the picture is similar to 1945. The Compact regulation has practically no significance in the Central Division.

In 1948, which is the year that we have a total reduction in Wyoming amounting to 6,000 acre-feet, you will notice that the 1:50 limitation takes over at the beginning of the regulation period again, and extends through July 15th. Throughout the balance of the season, there would be some reduction for all but a very few days. 1948 is below average in the Central Division as far as supplies are concerned.

In 1953 we have a picture that is somewhat comparable to 1948, in which there is a sizeable reduction for two or three weeks under the 1:50 limitation, and then very little effect for the next three or four weeks, and some reduction later in the season again. In that year we had a total seasonal reduction of, I believe it is, 4500 acre-feet from the time of the May regulation period.

Then Plate No. 19 gives us the 1954 picture under a dry season in which the 1:50 limitation would be in effect for about 36 days, leveling off the diversions at that point, and the reduction continuing throughout the rest of the irrigation season.

Plate 20 shows the same information, coming back to 1944 again, for the Idaho Section; and in addition to that I have plotted the flow leaving the Division, which is the sum of the flow passing Stewart Dam and the flow in the Rainbow Canal. You will notice during the early part of the regulation period in that year, that Idaho receives quite an increase from her actual diversions, but at the same time there were quite sizeable flows leaving the Division. They gradually got smaller throughout the year.

In 1945 the picture again reflects the results of late season storms. The flow leaving the Division was very large comparatively speaking in August and September, with a corresponding large increase in Compact allocation to Idaho.

In 1946 you will notice that the 1:50 limitation also takes effect in Idaho, which tends to reduce them from what the Compact allocation would have been otherwise, but is still above their actual diversions in each year. Here again in a year that is a little more average, our flow leaving the Division cuts down rapidly following high water and remains somewhat lower throughout the season.

In 1947 we get an unbalanced picture again due to seasonal storms which were very unusual.

In 1948 our picture is similar to 1946 again inasmuch as the flow leaving the Division is not nearly as great, and of course Idaho

would stand to benefit by the reduction that took place in Wyoming in that year.

The same thing would be true in 1953 in which their Compact allocation from the beginning of the regulation period is well above their actual diversions.

In 1954, Plate No. 26, the flow leaving the Division is relatively minor throughout the entire season. The 1:50 limitation again, as in Wyoming, would set the limit of Compact allocations throughout the entire month of June and the first 5 days of July. But throughout the entire season, the Idaho Section of the Central Division would receive a great deal of benefit under Compact operation.

Now that is a brief picture of the graphical analysis of the direct flow provisions of Compact operation. It is not a picture that we can look at immediately, as I mentioned earlier in the discussion, and say, "Well this will happen," or "This will happen," on any particular years, because the years are radically different. But by choosing years that are somewhere near the average and examining the graphs for those particular years, I believe we can get a fairly good picture of Compact regulation in these two Divisions.

That is all I have, I think, Mr. Chairman. If you have some questions I will be glad to try to answer them.

THE CHAIRMAN: Would the Commission like to question Mr. Jibson now, or do you want to adjourn for lunch?

COM. BISHOP: Mr. Chairman, I think it is a good time for us to adjourn and sort of have a little caucus with each one of our groups. I move we adjourn until 1:30. We will try to get back at that time.

THE CHAIRMAN: You have heard Mr. Bishop's motion. Is there a second?

COM. CLYDE: I will second it.

THE CHAIRMAN: It has been moved and seconded we recess until 1:30. (Thereupon a vote was taken and Com.Bishop's motion carried unanimously.)

(11:57 a.m. Luncheon Recess.)

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(1:35 p.m. Commission reconvened. All Commissioners present.)

THE CHAIRMAN: In starting the discussion on Mr. Jibson's report, there are two kinds of questionings. One might be on details on the graphs that is of interest to some particular person; and I am sure that Mr. Jibson would be glad in between times today and tomorrow to go over a lot of those details on the side with anyone, where there are just one or two persons interested. The other questions then we could go ahead with that pertain to the Compact and everyone here. I just throw that out as a suggestion before we start with Mr. Jibson.

Does someone on the Commission have questions?

COM. CLYDE: Mr. Chairman, there is one question I would like to ask him, maybe he can answer it rather quickly, and that is: What would be the effect on this analysis he has made if the regulation was begun when the divertible flow was 2,000 second-feet instead of 1250?

MR. JIBSON: Mr. Clyde, I have worked up a little information on that. I don't have enough copies to distribute to everyone here; I do have enough to distribute I think to the Utah and Wyoming groups

perhaps. That question came up in the last meeting, and do you have your copy here that I gave you at one time of this information?

COM. CLYDE: We have it right here.

(Document is distributed.)

THE CHAIRMAN: Do you have one for the Idaho group?

MR. JIBSON: We can give them one. I don't have enough for everyone.

COM. BISHOP: Mr. Chairman, before we start this discussion of this divertible flow situation, I would like to state that the Wyoming group caucused during the lunch hour and we have some ideas about consideration of the storage phase. We have delegated Mr. Person to represent Wyoming so we won't have a lot of conflicting ideas coming up for the record. And I would like, before we go on with this--we might save a lot of time--to have Mr. Person make a statement at this time.

MR. MERRILL: Wouldn't that come up better after Mr. Thomas has made his report?

COM. BISHOP: It is all right to make the report but before we go into a discussion of it, I would like to have Mr. Person make a statement.

MR. PERSON: First, it is very short, so it won't take any time. We certainly want to compliment Mr. Jibson on a very excellent report. It shows what the Compact as written would do in the various sections. One thing, we did have a feeling, without arriving at any definite conclusions, that we shouldn't start regulation really before the irrigation season. That is, those small regulations before

the peak flows would just cost money and probably wouldn't make anyone any money. I think you will agree with that.

COM. BISHOP: That is right.

MR. PERSON: But that is a detail we can discuss later.

MR. JIBSON: I think our discussion here might clarify that a little too; it is related.

The question came up at the last meeting as to why we used in the Upper division a figure of 1250 cfs when that is actually about 1:69 as a starting point for regulation instead of the 1:50 basis, which would give us 1720 cfs, the same as we had used in the Central Division. The 810 cfs divertible flow is based on a 1:50.

So in between meetings, I went back to the years of diversion record and worked up this short table to show just what difference it would have made had we started regulation when the total divertible flow got to 1720 cfs in the Upper Division rather than 1250. In that table I have recorded each year the dates at which the divertible flow was between 1720 and 1250, I have shown the divertible flow and shown the rate of diversion on a Section basis for each of the Sections in the Upper Division, and then I have shown the flow passing Pixley for the same time.

I still have a few more of these if you want them. I wasn't sure we would be called upon for this information today and I didn't make enough copies. (Additional copies distributed.)

Before we summarize what might be said as a finding on these, let us look at the tables. You will notice in 1944 there is a period

from May 11 to 13, and again May 24 and 25, and then again four days in July when the divertible flow would have been in that range. During that time the Upper Utah Section, which is just the one canal, the Hovarka Canal, was diverting at a rate of 1:20 and 1:22, and so on. The Upper Wyoming rate was varying from 190 acres per second-foot down to about 70 in that period. Lower Utah's varied from 88 down to about 49. Lower Wyoming's, from the maximum--well, that is when they start to cut down, that 1100; but theirs was in the range of about a hundred, they were above 1:50 in other words. But at the same time, the flow passing Pixley Dam was about 400 second-feet throughout nearly all that period.

Now we know there is 15 or 20 second-feet passing Pixley Dam that can't be taken up except right at the Dam itself ⁱⁿ ~~and~~ Pixley Canal. But when you get up in the neighborhood of 100, 200, or 300 second-feet passing Pixley Dam, that is an indication that there is quite a lot of water in the entire channel coming down. And the point I am making is that even though these diversions were low on an acreage basis, second-foot per acreage, there was sufficient water passing Pixley at the time that they could have been much higher had they wanted the water. That is one point.

The other point is that these periods primarily occur before the spring flush, early in May, again in line with the point Dean Person brought up.

In 1945, you see that period is quite extensive in May and in June, and there are quite a few days in July. We did get down to a

rather low figure at Pixley Dam for 8 or 10 days in June and the latter part of May. Regulation at that time under a higher divertible flow would certainly have been significant for those few days. But in general for that year, the flow was quite large passing Pixley.

In 1946 again we have quite a period in May and a shorter period in June, and again for the most part we have fairly large flow at Pixley Dam. Even though their acreage rates here are still above 1:50, the actual rate of diversion is less than 1:50; the relative acreages are higher.

The same picture is true in 1947; we have extremely high flows passing Pixley.

In 1953 we have only a short period that we have record on, the latter part of June, and in July. We don't have diversion records in May, and the extent of that period in May is not known.

In 1954 from the start of our diversion record collection, they would have been under regulation; so I have no basis to say how much this effect might be in May, 1954.

Now from that I have summarized just a few points, not for the purpose of making a statement as to whether it should be or shouldn't be, but to help you people decide whether or not that figure should be changed. I have stated:

"1. The divertible flow will be between 1250 cfs (1:69) and 1720 cfs (1:50) for longer periods prior to high water (May) than following high water.

2. In average years during this early period there is considerable water passing Pixley indicating that sections are not as yet diverting most of the available supplies.

3. During years of diversion records (1944-47; 1953,54) diversions in Upper Wyoming and Lower Utah equal or exceed 1:50 for about one week to 10 days. This period was somewhat longer in 1953."

Now in our study of the graphs this morning you noticed-- I didn't go into that in as much detail perhaps as I should--but I have shown on each graph an arrow where 1:50 lies for section. And if we will go back to the first--well, let us just take the first group of graphs in order here, take Plate 1 for instance. You see I have a total divertible flow there, 1:50, at 850 second-feet; and the Upper Wyoming diversions only reached that point about three days in that year. The next plate, you see it reached it for about 7 or 8 days.

THE CHAIRMAN: Will the record show which plate you mean?

MR. JIBSON: We are going right through, Plate 2. And now Plate No. 3 shows just about a week at which that 1:50 rate was exceeded.

COM. CLYDE: That is a week above 800?

MR. JIBSON: A week above 850 second-feet, which is a 1:50 rate. There in only about a week when their actual

diversions exceeded that amount. 1953 was a little exceptional; there it was above that amount when we started collecting diversion records. We have about a week of records in which it was above, and it was above that for a few days before that, no doubt. In 1954, of course, it never got up to 1:50 at all.

Now coming down to Utah and Plate No. 7. 1:50 is right at 700 second-feet. I have those exact figures and I will give them to you if you want to write them down. Suffice it to say here, it is right near 700 second-feet. Lower Utah diversions got up above that for 10 days or 2 weeks in the early part of June and then just a very brief period the latter part of June.

Plate No. 8, 1945, shows almost the same picture. There were two short periods in which their rates of diversion on a Section basis reached that rate. 1946, Plate No. 9, it only shows a couple of days. Plate No. 10 only shows 4 or 5 days. Plate No. 11, as in Upper Wyoming, they were diverting heavy when they finally got the water in 1953. I believe one reason for that was the fact that we had such an extremely dry May that their diversions were unusually heavy during the flush, more so than in other years; but they were above it for the biggest part of the month of June in the year 1953. 1954, of course they never got anywhere near it.

So that is the basis of the third statement which I just completed here, that diversions in Upper Wyoming and Lower Utah equal or exceed 1:50 for about one week to 10 days on an average basis. And then my fourth point that I made just from studying the table:

"In 1954 divertible flow was below 1250 during period of diversion records (June 1 - Sept. 30). In May supplies would indicate that divertible flow would have been between 1250 and 1720 for most of the month."

Now we have one of those situations there during the month of May, 1954, in which as near as I can tell from the supplies, it would have been hovering in between the 1720 and 1250 most of the month; and of course in a year like 1954 it is very significant as to whether regulation would start at 1250 or 1720.

But to sum it up briefly, in the other years, it has very little significance in average years. And it will have this effect also, it will start regulation, you will notice here, immediately following your peak. Your peak diversions come here (indicating on graph), and just a few days later you are under regulation in the Upper Division if it was raised to

1720. It almost has the effect of starting regulation right when you are at the peak of diverting.

THE CHAIRMAN: Does that give you the information you asked for?

COM. CLYDE: Yes.

COM. COOPER: And that is always the case, is it Mr. Jibson, every year?

MR. JIBSON: No, I would say in average years that is the case. As I mentioned, in 1953 and 1954 it would have been to their advantage to have had the higher rate. And particularly in 1954, since there was not much of a peak diversion rate, why it would have had the advantage to the people in Utah of the Upper Division of putting regulation into effect for most of the month of May; whereas, under present conditions there were two or three weeks in May, probably two weeks, that wouldn't have been under regulation.

COM. CLYDE: Mr. Chairman--in effect then, Mr. Jibson, the 1:50 diversion would start regulation off sooner, but it would not be used in most of the years.

MR. JIBSON: That is the analysis that I would make of it, yes.

THE CHAIRMAN: Is that all, Mr. Clyde?

COM. CLYDE: Yes, thank you.

MR. IORNS: I would like to call your attention to what is entailed here as far as river administration is concerned when you pick a divertible flow as the basis on which you will designate the time at which regulation will begin. In order to determine divertible flow you have to have a daily discharge record of all the canals; and consequently, it is going to require there a continuous record collection of all canals on the river system.

If there could be some figure picked out, critical flow at say Woodruff Narrows or at Pixley, at which you would say, when the flow at this point on the river system drops to less than a certain figure, why then regulation would automatically go into effect on a certain basis, you would have an indicator then that would save you a tremendous amount of expense in river administration. For instance, at the 1250 here, if 1250 is written in the Compact, from the day the irrigation season first begins, whenever the total divertible flow is less than 1250, although it may be in the first part of May when the weather is cold and even snow is on the ground, why you have to put the river under regulation.

I have an unpublished work I prepared on the basis of earlier records, correlation curves in which I related the

flow at several points to the total divertible flow in the various river reaches. As I recall, those correlation curves I got, by using the period of time following the peak runoff, I was able to produce good correlation curves. In other words, it was kind of a recession curve, is what it really was, based either on the flow at the Utah-Wyoming State Line way up at the headwaters, or on Woodruff Narrows. On either one of them it gave me about the same results.

However, these correlation curves were not the same for each year. They would be roughly parallel, but they didn't coincide, and they made quite a little difference in what would be, you might say, if we were going to say what is the critical flow that should be selected for Woodruff Narrows from year to year. On the basis of what records we had, there was quite a little variation in there.

I would be in hopes that this Compact could be written in such a way there that the river master, based on knowledge that he would have on conditions in the river system, on surplus flows passing Pixley, on the indication that a critical period is approaching or that the flow will be critical all summer long-- that he would be able to determine when regulation should begin.

I don't know just myself how to write it into the Compact; but I think it would certainly save a lot in administration of the river if some practical consideration were given to that, and a practicable, workable, critical flow designated at which time we would start collecting records all throughout the river system.

MR. PERSON: Don't you think that probably could be worked out? At least we could set a flow at, say, Pixley. When the total divertible flow becomes about 1250--

MR. IORNS: I think the thing is, the river master after a few years of operation would be able to determine that, because it is going to make a different balance in the sections of the river in which water is going to be applied. And I don't think we can determine it on the basis of figures now because we have too much of an unequal distribution. After we put it into operation we will have more of an equal distribution, and on the basis of that he will be able to determine that.

But I think you should include some language in your Compact for the river administration--whatever organization is set up--some more practical ways of determining when regulation

should begin rather than to say that we have to collect records continuously in order to determine whenever it is below 1250.

MR. SMITH: Would it be a good idea to say it would begin when the river master determines in his discretion, or when ordered so to do by the Board, and not specify a certain date?

MR. IORNS: We tried some practical things in it. I think one of the early things that Mr. Skeen suggested, and we had it in earlier drafts of the Compact, when a downstream water user in this particular river section was deprived of water to which he was justly entitled, or something like that, then he requested that the regulation begin. I think that is a good way to solve this at the time. There are a lot of years when the flow will drop below 1250 and I know it would be of no value at all to start this strict regulation of the river because every body is all wet up and their crops are ready to cut and so forth.

MR. SMITH: That could be worked out some way.

MR. IORNS: If some additional consideration is given to proper language in the Compact, that that can be taken care of without requiring continuous discharge records on all canals beginning the 1st of May, because that is a tremendous and costly job.

THE CHAIRMAN: I would like to ask Utah and Wyoming, isn't that a subject which the two states can cover in a

caucus, or separately? Doesn't that pertain to the two of you?

COM. CLYDE: I think that can be handled there. The problem is to get some practical means that we can work on.

THE CHAIRMAN: As I understand it from what you said, you will not be able to put that figure in now, so you probably would work for language that permits adopting it later on.

MR. IORNS: I am satisfied the river administrator, after he has had a few years' experience, can select critical flows at, say, Woodruff Narrows, that wouldn't be right on the nose, you might say.

COM. CLYDE: I think you could probably write into the Compact a provision for total divertible flow, and that is certainly fixed, and then as the Commissioner acquires experience he could convert that into some flow at some point that would do the thing you have in mind.

MR. IORNS: I think instead of saying, "beginning at 1250" or "or by some equivalent method that would give the same result" or something like that so far as division between the states and regulation of the river is concerned. I don't know what language you should use.

MR. JOHNSON: I think it was my idea at the last meeting that we begin regulation at a higher figure. I happen to be in the lower part of the Lower Utah Division. And just into Wyoming, crossing the Line there, the water in May even, there were 2,000 divertible feet in the river. If there had

been management then I would have had some water. And if you get it so low a figure as 1250 for that low river system, you just as well forget it and don't have any figure at all, because it wouldn't be humanly possible to get any water down to the lower part. So I favor a figure as high as 2,000, as I said before. I am sure I would have one hay stack instead of not any if we used such a figure this year.

MR. IORNS: Lawrence, do you think it would be alright to set a figure of, say, 1250--when the river drops below a certain point, say a divertible of 1250, or when requested in writing by an injured water user in the Division, something like that?

MR. JOHNSON: Wasn't that figure just brought out of the air, that 1250? Why use it at all?

MR. IORNS: The figure was brought out as kind of a-- it is kind of a compromise figure--it isn't setting it too high-- at which we will begin regulation on the river when you are still wasting 500 or a thousand second-feet past Pixley Dam.

In other words, I think the thing we need here is, when you want regulation on the river is when you need regulation. Now to take any figure and say that is it, I don't know; it might be too low or it might be too high. Your 2,000 might be too high; it might require regulation clear throughout the summer from the 1st of May on.

I rather like this, that it is when one of the downstream water users becomes short, the river master or adminis-

trator would put regulation into effect, on written notice.

MR. PERSON: I think this is a problem between Utah and Wyoming and suggest we proceed with the agenda.

THE CHAIRMAN: That is what I asked a while ago. Isn't this something that Utah and Wyoming should settle before the end of our session? Is that agreeable with both Utah and Wyoming?

COM. CLYDE: That is agreeable with Utah.

THE CHAIRMAN: We will pass that up. Are there other questions on Mr. Jibson's report?

COM. COOPER: I just have one question, Mr. Chairman: This report that you gave, as I understand it, just simply shows the actual application of the years that are indicated here in your report?

MR. JIBSON: That is correct. It shows the actual application of the Compact as it applies to direct flow division for the years that we have records.

COM. COOPER: It doesn't have any effect on priorities or any other thing, just--

MR. JIBSON: We just attempted to show what effect it has on past diversion practices.

COM. COOPER: That is all the questions I have, unless these other men have some questions. Do any of you have any questions? (No response).

THE CHAIRMAN: Mr. Bishop had a question here.

COM. BISHOP: I would like to have Mr. Person make

a statement that we thought should be made at this time. It might save a lot of time in arguing about it.

MR. PERSON: It is already in the record. It has been made and it is in the record.

MR. MERRILL: What is it?

MR. PERSON: That it is a very fine report and we question the point of starting regulation before the irrigation season starts, which the Compact does under the 1250 or 1720.

COM. BISHOP: You wanted to make a statement about this storage that should be taken up before the diversions--

MR. PERSON: There are some details that have us a little concerned, but before we discuss those now, I think we should get to the storage problem.

THE CHAIRMAN: You mean for Mr. Thomas to go ahead on the storage and you come to your questions later?

MR. PERSON: Yes.

COM. BISHOP: The proper allocation of storage might make some difference in our idea on, for instance, just how and why Upper Wyoming should be regulated when they are only getting 2.1 acre-feet per acre, and they are regulated down to 2.07, or 0.03 of an acre-foot, in order to make Upper Utah get 3.5 acre-feet per acre. There are several of those things which ought to be considered, as far as it is equitable to do those things, and even sensible as far as I am concerned. But if we get the storage up there to help take care of these people, it might make some differences in our ideas.

THE CHAIRMAN: If there are no further questions we will call on Mr. Thomas. Do you have further questions?

COM. COOPER: We haven't any questions. I would favor Mr. Thomas presenting his report now.

THE CHAIRMAN: Is that all right with Utah?

COM. CLYDE: Yes.

THE CHAIRMAN: Mr. Thomas.

(Copies of report are distributed.)

MR. THOMAS: This is Report No. 29. It consists of a brief report on the estimated effects of additional storage development in the Bear River Basin upstream from Stewart Dam. Essentially in going through the report I will stick to the written material. I will make a few explanations as I go; Mr. Chairman, will you want Mrs. Crowder to take those down?

THE CHAIRMAN: Yes, she can take any added explanations as you go along I think, the same as she did for Mr. Jibson.

MR. THOMAS: If you will turn to page 1:

"At the last Bear River Compact Commission meeting on September 28-29, 1954, the Commission requested the Bureau of Reclamation to study the effects of additional water storage upstream from Stewart Dam as based upon three hypothetical quantities of storage that might be allowed, as a maximum, in any one year. The three storage quantities specified were 20,000 acre-feet, 30,000 acre-feet, and 40,000 acre-feet. The study has been made, and the results

are given in this report.

This report gives the estimated effects of additional upstream storage (upstream from Bear Lake) upon water uses both above Bear Lake and below Bear Lake. The information is given in summary form in tables and graphs. The detailed calculations and reservoir operation studies upon which the summary tables and graphs are based are in the files of the Bureau of Reclamation. These may be examined by the Compact Commissioners or other interested persons.

Studies of Storage Above Stewart Dam

The potential storage sites upstream from Bear Lake, including those on tributaries, are rather numerous. Consequently, a large number of storage combinations would be possible, particularly within the larger storage allowances that were specified."

That is, the 30,000 or 40,000 acre-feet.

"It is doubtful that any of the various storage sites have been studied in sufficient detail to establish with accuracy the economic limit of development for each."

I know the Bureau hasn't studied the sites in that detail and it seems unlikely that any other agency or person has either.

"Certainly, all of the sites have not been studied sufficiently to determine the best combination of sites that could be developed, including a selection of the reservoirs and their individual capacities that would comprise the best over-all development.

Within the short time that has elapsed since the last meeting no attempt has been made to study in detail any individual storage sites, or to arrive at any conclusions concerning the best combination of sites. It has been deemed practicable, instead, for the purposes specified by the Commission, to group the sites into two main categories, and thus to simplify the studies without introducing any substantial error in estimating the effects of additional storage above Stewart Dam. Such grouping probably minimizes the over-all margin of error to the extent that errors on individual sites are offset or averaged out by errors on other sites within the group.

The first reservoir group, or Group 1, includes the Woodruff Narrows site on the Bear River main stem and also includes any combination of sites on tributary streams upstream from Woodruff Narrows. This grouping is appropriate because of the availability of the Woodruff Narrows stream flow record for determining the combined water supplies storable at Woodruff Narrows and the upstream tributary sites. Different combinations of Woodruff Narrows storage and the various upstream tributary developments probably would have no appreciable effect on the over-all storage supply for the group.

The other group, Group 2, includes storage sites on tributary streams downstream from Woodruff Narrows. These sites are on Woodruff Creek, Big Creek, Randolph Creek, and

Twin Creek. Storage sites exist on some of the other tributaries below Woodruff Narrows, but these were excluded from the study because previous Compact studies by the Geological Survey indicate that there are no requirements for supplemental water in the areas under these sites. Stream flow records either are not available or are insufficient to permit accurate determinations of storable flows at most of the Group 2 sites. A fairly good stream flow record, however, is available for the largest site (Woodruff Creek) and since the other sites are small the storage operation studies of the Group 2 reservoirs probably are not greatly in error.

In making the storage studies for the three different storage allowances, the same rules of operation were applied to each group of reservoirs. In the three studies the maximum inflows to storage permitted in any one year were 20,000 acre-feet, 30,000 acre-feet, and 40,000 acre-feet for both groups of reservoirs. All studies were based on stream flows for the 1924-1954 period. In instances when findings for the 1924-1948 period appeared desirable, such findings were extracted from the 1924-1948 portions of the 1924-1954 studies.

In accordance with Article V of the July 8, 1954, draft of compact, storage operations were not permitted to interfere with direct flow rights or existing storage rights above Stewart Dam. Inasmuch as storage operations of existing

reservoirs are reflected in the stream flow records used in the studies, interference with existing storage rights was automatically eliminated. It was assumed for the October 1-April 30 nonirrigation season that additional storage would not interfere with direct flow rights above Stewart Dam. During the May 1-September 30 irrigation season, storage was permitted only to extent of flows in excess of 700 second-feet as measured in Bear River at the Border gaging station.

Technically, this 700 second-foot flow limitation at Border is not a direct indication of the upstream flows that could be stored without interfering with existing direct flow rights. According to previous studies of Mr. Iorns and Mr. Jibson, however, it can be used generally without inducing appreciable error. As in previous reports by Mr. Iorns, Mr. Jibson, and the Engineering Committee of the Compact Commission, the 700 second-foot limitation was used in the studies forming a basis for this report, in order to avoid a very large amount of detailed streamflow and diversion calculations on a daily basis.

Releases from storage were made in accordance with supplemental storage requirements of irrigated lands above Stewart Dam, as estimated by Mr. Jibson."

I would like to say that Mr. Jibson worked hard and did a good job in getting those estimated^s to us in time so that we could finish the studies and also the report in time for this meeting.

"Mr. Jibson's estimates of the supplemental storage requirements were for the May 1-July 15 period and were based on water regulation (direct flows) as provided by the July 8, 1954, draft of compact, rather than on past river operations. In the form furnished by Mr. Jibson, the estimated supplemental requirements represent the requirements as measured at the storage site, rather than the aggregate supplemental requirements as measured at the points of diversion of the various canals. The difference between the aggregate supplemental requirements and the supplemental requirement at the storage site would be that portion of return flow that could be recovered from a release from storage and be reused within the area participating in the storage development. The supplemental requirements on storage, as estimated by Mr. Jibson, are as follows:."

The table shows the estimates of the supplemental requirements on storage for the 1924-1954 period. It consists of two parts. The first column following the water year column, which is "Storage on main stem and tributaries above Woodruff Narrows," corresponds to the Group 1 reservoirs as I defined previously. The next column, "Storage on tributaries below Woodruff Narrows," corresponds to the Group 2 reservoirs. And then of course the total. I won't bother to read this table. I will just point out that the high requirements for both groups of reservoirs came in the year 1934, and the low came in the year 1950. If you will turn to the next page then:

"In addition to the provisions of the July 8, 1954, draft of compact, one other factor could influence the effects of additional storage above Stewart Dam. This is the reservoir capacities that might be developed for holdover storage. The compact draft includes no restrictions on reservoir capacities. The estimated supplemental requirements on storage vary considerably from year to year. In some years the estimated supplemental requirements are substantially less than the quantity of water available for storage, even under a storage allowance as low as 20,000 acre-feet." For example, the year 1950. In that year the supplemental requirements were estimated at only 1200 acre-feet.

"In years when the supplemental requirements would not be sufficient to require release of all water in storage, some storage could be held over for use during the following year or years when the supplemental requirements would be greater than the annual storage allowance, assuming of course that holdover capacity (capacity in excess of the annual storage allowance) would be provided. Since the average annual storage and use of water would be greater with holdover storage than without, and since the compact draft included no restrictions on holdover storage capacity, it was necessary to select capacities for the two groups of reservoirs before proceeding with the storage operation studies.

As a guide for selection of reservoir capacities for

use in the storage studies, the reservoir yields (within the estimated supplemental requirements) for each reservoir group were compared with the reservoir capacities required to obtain such yields. Separate comparisons were made for the different conditions imposed by the three storage allowances (20,000 acre-feet, 30,000 acre-feet, and 40,000 acre-feet) specified for the study. To facilitate the comparisons, reservoir capacity-yield diagrams were prepared. These diagrams are reproduced on pages 24, 25, and 26 of this report. Estimated evaporation losses are reflected in the diagrams."

I suggest you don't bother to turn back to the diagrams yet until we get a little farther.

"The reservoir capacity-yield diagram on page 24 is based on an annual storage allowance of a maximum of 20,000 acre-feet. If all of the Group 1 and Group 2 reservoirs were allowed to participate in a 20,000 acre-foot storage allowance, development of the best large storage site (Woodruff Narrows) probably would be precluded. In this event the entire storage allowance could not be used, at least to best advantage."

The reason for that, the Group 1 reservoirs include Woodruff Narrows and also tributary sites. One tributary site alone, that at Hilliard on Sulphur Creek, would take 4500 to 5,000 acre-feet. And as will be shown later, the Group 2 reservoirs might take another 7500 acre-feet. With a 20,000 acre-foot

storage allowance, this would leave only 7500 acre-feet for Woodruff Narrows, which probably wouldn't be enough and it could not be used.

"Consequently, the reservoir capacity-yield diagram for a 20,000 acre-foot storage allowance is based on the assumption that the entire allowance would be used at the Group 1 reservoirs at Woodruff Narrows and on the upstream tributaries. The reservoir capacity-yield diagrams on pages 25 and 26 for annual storage allowances of 30,000 acre-feet and 40,000 acre-feet respectively, are based on the assumption that the storage allowances would be used in a combination of the Group 1 and Group 2 reservoirs."

Now if you wish to turn to the diagram on page 24, this diagram shows the estimated reservoir yields within the supplemental requirements as estimated by Mr. Jibson. The reservoir capacities are shown on the horizontal scale and the reservoir yields are shown on the vertical scale. Studies of three reservoir capacities, 10,000 acre-feet, 20,000 acre-feet and 30,000 acre-feet, were made; and the average annual yield obtainable from each of these three capacities were plotted and a smooth curve drawn through the three points.

The straight line that you will notice that is tangent to the curve between the capacities of 15,000 and 20,000 acre-feet, indicates graphically by its slope a capacity yield relationship of two to one, that is, one acre-foot of yield for each two acre-feet of capacity. The point on the

curve at which the straight line is tangent to the curve is the point at which the two-to-one relationship would exist. Turning back to page 7--

COM. CLYDE: Mr. Thomas, would you elaborate on how you determine the annual yield, the average annual yield?

MR. THOMAS: Would you like me to answer the question now or later?

THE CHAIRMAN: He has asked the question. Do you want it answered now? It should wait until after he is through, I think.

COM. CLYDE: All right.

MR. THOMAS:

"From the capacity-yield diagram for the 20,000 acre-foot storage allowance (page 24) it can be seen that the first 5,000 acre-feet of capacity in the Group 1 reservoirs would yield about 4,700 acre-feet annually, or nearly 1 acre-foot for each acre-foot of capacity. The next 5,000 acre-feet of capacity (between 5,000 and 10,000 acre-feet) would yield 4,100 acre-feet annually, or 0.82 acre-foot for each acre-foot of capacity. The next 5,000 acre-feet of capacity (between 10,000 and 15,000 acre-feet) would yield 3,400 acre-feet annually, or 0.68 acre-foot for each acre-foot of capacity. The next 5,000 acre-feet of capacity (between 15,000 and 20,000 acre-feet) would yield 2,500 acre-feet annually, or 0.5 acre-foot for each acre-foot of capacity. Reservoir capacities in excess of 20,000 acre-

feet would have even a smaller rate of yield."

I think we will be through with the diagram on page 24 at least for the time being.

"The low rate of yield for capacities in excess of 20,000 acre-feet justifies the adoption of a 20,000 acre-foot storage capacity for a 20,000 acre-foot storage allowance for the studies of the storage effects. This does not suggest that a compact limitation be placed on storage capacity. It means only that a 20,000 acre-foot capacity is reasonable for the study. Even if a much larger capacity were used for the study, this would result in only a slight increase in reservoir yield and an even smaller increase in depletion of the water supply storable in Bear Lake. Consequently, a 20,000 acre-foot reservoir capacity was adopted for the study of the 20,000 acre-foot storage allowance."

In other words, no holdover capacity in excess of the storage allowance.

"Not because it would assist greatly in selecting reservoir capacities for use of the storage studies, but mainly out of curiosity, a study was made of the relationship between estimated reservoir development costs and reservoir yields for the Woodruff Narrows Reservoir. Because of the low-cost storage at this site and the fact that the reservoir capacity would increase very rapidly for each foot of dam height, and for each dollar invested in construction, it appeared conceivable that a large amount of holdover

capacity might be justified. The exceptionally good cost-capacity relationship is illustrated by the diagram on page 27."

This diagram was an estimate of the cost of developing the Woodruff Narrows Reservoir for various capacities. This cost estimate of course is a preliminary estimate. Capacity is shown horizontally and the estimated costs are shown vertically. From everything that is known now, the Woodruff Narrows is a very good site, as shown by this diagram. I think that is the only particular interest in that diagram, to show that is a good site.

*Using the cost-capacity diagram on page 27 and the capacity-yield diagram on page 24, a cost-yield diagram was prepared, as shown on page 28."

The curved line on this diagram shows the estimated development cost as plotted vertically, against the average annual reservoir yield shown horizontally. On this diagram the straight line was not drawn to indicate any particular slope or any given or predetermined relationship between costs and yields, but was drawn from the point of origin--that is, the lower left-hand corner of the graph--to be tangent with the lowest point on the curve. The point at which the straight line is tangent to the curve indicates the maximum reservoir yield that could be obtained per dollar of investment in construction. Now if you will turn back to page 9, please:

"As indicated by the cost-yield diagram and the

capacity-yield diagram, the most favorable investment in a Woodruff Narrows Reservoir, on the basis of a 20,000 acre-foot storage allowance, would be one that would yield about 15,000 acre-feet annually and have a capacity of slightly more than 20,000 acre-feet."

This capacity is obtained by entering the diagram on page 24 with the 15,000 acre-foot yield and picking off the corresponding capacity figure, which is a little over 20,000 acre-feet.

"Although not intended to assist in a selection of the reservoir capacity for use in the storage study, the diagrams explained above tend to substantiate the selection of a 20,000 acre-foot capacity for the 20,000 acre-foot storage allowance study."

If you will turn now to page 25, please. This diagram is very similar to the one on page 24 for the 20,000 acre-foot allowance, except it includes two curves instead of one. One curve is for the Group 1 reservoirs and the other is for the Group 2 reservoirs. The straight lines show the same two-to-one capacity yield relationship that was explained previously. If you would like to just keep looking at this diagram while I go back to the report and read some more, or you can go back and read with me, whichever you like.

"From the capacity-yield diagram for the 30,000 acre-foot storage allowance (page 25) it can be seen that the Group 2 reservoirs would yield 0.5 acre-foot or more for each acre-foot of capacity, up to a total capacity of about

7,000 acre-feet. Capacities in excess of 7,000 acre-feet would have a very low rate of yield. The Group 1 reservoirs would yield 0.5 acre-foot or more for each acre-foot of capacity, up to a total capacity of nearly 20,000 acre-feet. Capacities in excess of 20,000 acre-feet would have a low rate of yield. Despite the low rates of yield for capacities in excess of 7,000 and 20,000 acre-feet, a 7,500 acre-foot capacity for the Group 2 reservoirs and a 22,500 acre-foot capacity for the Group 1 reservoirs were selected for the 30,000 acre-foot storage allowance study in order to permit full use of the storage allowance."

Again in this case for the 30,000 acre-foot study, no holdover capacity was used in excess of storage allowance. We should be now at the top of page 10--I think it might be better though if you would like to turn to the diagram on page 26, and I can read to you from the narrative.

"The capacity-yield diagram for the 40,000 acre-foot storage allowance (page 26) includes the same curve for the Group 2 reservoirs as is shown on the diagram for the 30,000 acre-foot storage allowance. This is because the Group 2 curve in both instances is based on substantially complete development of the water resources of the tributary streams below Woodruff Narrows. The Group 1 curve for the 40,000 acre-foot storage allowance rises to a somewhat higher level than the corresponding curve for the 30,000 acre-foot storage allowance because more water could be developed with the

larger storage allowance.

Although the Group 1 reservoir capacity-yield curve on the 40,000 acre-foot storage allowance diagram rises somewhat higher than the corresponding curve on the 30,000 acre-foot diagram, both curves are substantially the same for capacities less than 25,000 acre-feet. Only for capacities over 25,000 acre-feet does the curve for the 40,000 acre-foot storage allowance rise above that for the 30,000 acre-foot storage allowance. This means that for both storage allowances the rates of yield are good to fair for total reservoir capacities up to 25,000 acre-feet. The 40,000 acre-foot storage allowance would permit somewhat larger yields than the 30,000 acre-foot storage allowance for total reservoir capacities over 25,000 acre-feet, but for such capacities the rates of yield for the 40,000 acre-foot storage allowance would not be much higher than those for the 30,000 acre-foot allowance."

At this point I might explain one thing too: You should bear in mind that all of the material presented so far pertains only to a selection of reservoir capacities for use in the storage studies, in other words, whether or not to base the studies on holdover capacity in excess of the storage allowances. If you will turn back to page 10 now, the last paragraph.

"For the 40,000 acre-foot storage allowance study, a total capacity of 7,500 acre-feet was selected for the

Group 2 reservoirs, the same as that used for the 30,000 acre-foot storage allowance study. Despite the low rate of yield for capacities in excess of 25,000 acre-feet, a 32,500 acre-foot capacity for the Group 1 reservoirs was selected for the 40,000 acre-foot storage allowance study in order to permit full use of the storage allowance."

At this point you can see we just didn't use any holdover capacity in these studies.

"Using the selected reservoir capacities, annual operation studies were made for the three storage allowances (20,000, 30,000, and 40,000 acre-feet). To the extent possible under each storage allowance, reservoir releases were made in accordance with the estimated annual supplemental requirements on storage. As indicated by these operation studies, the extent to which storage in both the Group 1 and Group 2 reservoirs would improve the water supply and eliminate water shortages upstream from Stewart Dam is summarized in the tables on pages 12, 13, and 14. These tables show for each of the three storage allowances that were studied (1) the annual reservoir releases that could be made, (2) the estimated usable return flow that could be recovered from the storage releases, and (3) the estimated total water supply that would be made available in the area."

If you will turn to the table on page 12, please. This table shows the estimated supplemental water supply available from a 20,000 acre-foot storage allowance. The first column

after the water year column shows the total supplemental requirement. The figures in that column differ from the supplemental requirements on storage as shown in the table on page 5--those are the ones estimated by Mr. Jibson--by the amount of the recoverable return flow. That is the difference.

The next column shows the estimated supplemental supply obtainable from direct storage releases. The next column after that, the usable return flow; and the last column of course shows the total estimated supplemental supply available from the 20,000 acre-foot allowances. I won't read any of the figures in the table but the averages you see in the last column. The average for the 1924-48 period and the average for the 1924-54 period is an indication of the benefit to irrigators above Stewart Dam.

The table on the next page shows the same information for a 30,000 acre-foot storage allowance. You notice that the average estimated supplemental supplies are somewhat larger than on the previous page naturally, and of course they also indicate the benefit to the irrigators above Stewart Dam.

The same thing would apply to the table on page 14, that is the next page. It should be kept in mind that the table on page 13 and the table on page 14 include both the Group 1 and Group 2 reservoirs, while the table on page 12 is for the Group 1 reservoirs only.

On page 11 again, we are down a little past the middle of the paragraph:

"The usable return flows listed in the tables were taken from the diagram shown on page 29. The diagram is based on judgment derived from such stream flow, diversion, and consumptive use data as have been collected in the area involved, and also in other similar Western areas."

If you will turn to page 29. On this diagram estimated return flows are shown vertically in relation to storage releases shown horizontally. The upper curve represents the total return flow from a storage release. The distance between the curves indicates the return flows that can be recovered and be reused in the areas participating in the storage development. The lower curve shows the estimated return flows that would remain and reach Stewart Dam.

On page 11 again near the bottom of the page:

"The estimated aggregate supplemental requirements of the area, including that portion of the requirements that would be met by return flow from storage releases, also are listed in the tables to show by comparison how effective the storage supplies would be in relieving water shortages. The same information is shown graphically by the diagram on page 30."

If you will turn to page 30. This bar diagram shows the information given in the tables on pages 12, 13, and 14. It is just a graphical representation of the same data given in those tables.

The solid black bar represents the supplemental

requirements at points of diversion. The next open bar represents the supply obtainable from a 20,000 acre-foot storage allowance. The next open bar represents the supply obtainable from a 30,000 acre-foot storage allowance. And the last open bar represents the supply obtainable from a 40,000 acre-foot storage allowance, assuming of course that full development would be made under each storage allowance--in other words, after the reservoirs were built and put into operation.

Back to page 12 again:

"The diagram on page 31 represents a final summary estimate of the improvement in water supplies for the area above Stewart Dam with the three different storage allowances."

Now if you will turn to 31. This table summarizes on an average annual basis, the supplemental water supplies obtainable above Stewart Dam with various storage allowances. Storage allowances are shown horizontally and the average annual supplemental supplies are shown vertically. The curves were plotted from the data shown in tables on pages 12, 13, and 14 for the 20,000, 30,000, and 40,000 acre-foot allowances; but the curves could be used to indicate the supplemental supplies obtainable from any other storage allowance from zero up to 45,000 acre-feet, the two curves, one for the 1924-1948 period one for the 1924-1954 period.

I think now we have finished with storage above Stewart Dam insofar as it would benefit the irrigators in that area, and on page 15 we come to the depletion of water supply

were arrived at by applying the reservoir operations and the return flow diagram on page 29 as I mentioned.

The next page, 17:

"As shown in the preceding table the annual water supply storable in Bear Lake averaged 273,800 acre-feet for the 1924-54 period. As based on previous flow segregation studies of Mr. Iorns, Mr. Jibson, and the Engineering Committee, the 1924-1954 storable supply was used as follows. On the average, 92,700 acre-feet"--that is out of the 273,800--"annually was used for irrigation below Bear Lake to supplement the available natural flow supplies. The same 92,700 acre-feet"--that is annually--"was used for power as the water flowed down Bear River enroute to the irrigation diversions. On the average, 145,500 acre-feet"--again that is out of the 273,800 acre-feet--"of Bear Lake water annually was used solely for power during the 1924-54 period, and passed the Cutler power plant into Great Salt Lake. About 18,800 acre-feet annually of the 145,500 acre-feet was obtained from Bear Lake drawdown. After allowance for this drawdown, the storable inflow to Bear Lake was sufficient to provide an average annual supply of 126,700 acre-feet solely for power."

Take the 126,700 used solely for power, add to it the 92,700 for irrigation, and add to that 54,400 acre-feet, and that would total up to the 273,800 acre-foot figure that was mentioned.

"This was over and above the 92,700 acre-feet used

for both irrigation and power. The remaining 54,400 acre-feet could not be accounted for in summing up the records of river flows, lake inflows, lake outflows, and diversions, and presumably was lost mainly by evaporation and transpiration in Bear Lake and Mud Lake."

As I remember the segregation studies, leakage past Cutler Dam would also be a part of the 54,400 acre-feet. I am not positive but I believe that is the case.

MR. IORNS: We made an allowance, continuous flow, of about 45 acre-feet a day as leakage past Cutler Dam.

MR. THOMAS: I know that allowance was made and I believe it is reflected in the 54,400.

"The above water supplies provided by the storable inflows to Bear Lake are illustrated by the diagram on page 32."

If you will turn to that page. On page 32 are two pie diagrams showing past use of water supplies storable in Bear Lake. That represents present conditions, actual past use.

The diagram on top is for the 1924-1954 period in which the average annual storable Bear Lake supply was 273,800 acre-feet. Of the total storable supply, storage losses were 54,400 acre-feet, or 19.9 percent of the total. Used for irrigation and also for power--that would be enroute to points of diversion for irrigation--was 92,700 acre-feet, or 33.8 percent of the total storable supply. The remainder, 126,700 acre-feet

or 46.3 percent, represents the part of the storable supply that was used solely for power.

The diagram on the bottom of the page is for the 1924-1948 period, in which the average annual storable supply was 254,400 acre-feet. For that period the storage losses were 59,700 acre-feet or 23.5 percent. 100,000 acre-feet or 39.3 percent was used for irrigation and also for power. And 94,700 acre-feet, which was the remainder and amounted to 37.2 percent, was used solely for power.

On page 17 again, the last paragraph on the page:

"A depletion in water supply storable in Bear Lake definitely would result in a corresponding decrease in water supply available from Bear Lake storage. From the preceding explanation, however, including the diagram on page 32"--that is the one we just looked at--"it can be seen that none of the depletions listed in the table on page 16"--those on the average were 13,100 acre-feet for a 20,000 acre-foot allowance, 18,200 acre-feet for a 30,000 acre-foot allowance, and 19,600 acre-feet for a 40,000 acre-foot allowance. None of those depletions--"would cause any decrease in the Bear Lake storage supply for irrigation and other consumptive uses below Bear Lake. This is true because the average storable inflow to Bear Lake, after storage is developed above Stewart Dam"--by that I mean additional storage above Stewart Dam--"will remain more than large enough to meet the irrigation and other consumptive require-

ments below Bear Lake, and because the storage facilities at Bear Lake can completely regulate the high river flows in wet years for use in dry periods that occur years later.

One single circumstance determines whether irrigation and other consumptive requirements below Bear Lake will be met by Bear Lake storage. This is not additional storage above Stewart Dam, or the resultant depletion in storable inflow to Bear Lake, but is the extent to which Bear Lake is operated solely for power. This would be true after development of additional storage above Stewart Dam, but no more so than is true for present conditions. Development of additional storage above Stewart Dam would not change this fundamental fact.

Bear Lake Irrigation Reserve

If additional storage were developed above Stewart Dam and the irrigation interests below Bear Lake were to be assured of no decrease in water supply as a result thereof, some adjustment in the operation of Bear Lake solely for power would have to be made to allow for the depletion in storable supply. The provision for the Bear Lake irrigation reserve, as included in the draft of compact, is intended as a means of insuring that such adjustment in storage operations would be made. The provision for the irrigation reserve means simply that water could be released from Bear Lake solely for power only when the lake level was in excess of a certain elevation, as yet unspecified in the compact draft.

The volume of water in lake storage below that certain elevation would constitute the reserve and could be released only for irrigation and other consumptive uses, including incidental use for power as the water flowed down Bear River enroute to points of diversion.

The size of the reserve, and its corresponding lake elevation, required to assure the irrigation interests of no decrease in past water supply can be established rather simply. It is necessary only to compute the maximum net draft on Bear Lake for irrigation and other consumptive uses that ever occurred, and to add a small safety factor to allow for such quantities of water that might be released from Bear Lake for irrigation use but which might actually be passed by points of diversion and be used for power as a result of rainstorms or other unpredictable occurrences. In the above explanation the term 'net draft on Bear Lake for irrigation' means the amount by which the irrigation release exceeds the storable inflow minus lake losses, mainly ~~evaporation and~~ transpiration.

The maximum net draft on Bear Lake for irrigation occurred during the May 21, 1930-September 30, 1935, period. The net irrigation draft during this period amounted to 860,300 acre-feet. During the same period, the storable inflow was 668,700 acre-feet and lake losses were 485,000 acre-feet. After deducting the lake losses, the lake inflow available for storage and release from the lake amounted to

183,700 acre-feet."

That is not an annual figure; that is the total for this entire period. In other words, the 183,700 acre-feet was the net supply available from lake inflow after deducting the lake losses.

"Since 860,300 acre-feet was required for irrigation and only 183,700 acre-feet was available from net inflow to the lake, the remaining 676,600 acre-feet constituted an irrigation requirement on holdover storage in the lake. For present conditions and without a safety factor, this figure would be equivalent to the lake reserve required to assure irrigation interests below the lake that their future Bear Lake supplies would not be less than those available in the past. A safety factor (as mentioned previously) of 5,000 acre-feet annually for the 6-year period"--that would make a total of 30,000 acre-feet in the 6-year period--"is considered sufficient, and when added to the 676,600 acre-feet establishes the reserve at 706,600 acre-feet, as required for present conditions."

Incidentally, the figure of 676,600 acre-feet corresponds very closely with the reserve that apparently is now being maintained in Bear Lake under a so-called gentlemen's agreement, using a lake elevation of 5,912.75 as the corresponding elevation.

"Additional storage above Stewart Dam would deplete the storable inflow to Bear Lake, and thus would increase

somewhat the holdover storage, or the irrigation reserve, required for water supply assurance to the irrigation interests below Bear Lake. The necessary increase in the reserve to allow for additional storage development above Stewart Dam also can be determined readily. It is necessary only to add the 1931-1935 depletions resulting from any given storage development to the 706,600 acre-foot reserve required under present conditions. The 1930 depletion should not be added since it would occur prior to the May 21, 1930-September 30, 1935, period of maximum net irrigation draft on Bear Lake. The necessary increase in the reserve to allow for storage development above Stewart Dam under a 30,000 acre-foot storage allowance is determined as follows. In the table on page 16 in the column for the 30,000 acre-foot storage allowance"--you may turn to that page if you wish, that is page 16--"in the column for the 30,000 acre-foot storage allowance, the estimated depletions are listed as 24,200, 29,500, 7,600, 24,500, and 27,700 acre-feet for the 5 years in the 1931-1935 period."

I think you can find those figures in the table.

"The total estimated depletion for the period is 113,500 acre-feet."

That is obtained by adding the five figures.

"This is the necessary increase in the reserve for development under a 30,000 acre-foot storage allowance. The total reserve necessary for such development thus would

be 820,100 acre-feet (706,600 plus 113,500). Using the 1931-1935 depletions listed in the 20,000 acre-foot and 40,000 acre-foot storage allowance columns"--this is back in the table on page 16 again--"the necessary increases in the reserve for development under these storage allowances are determined as 82,300 acre-feet and 120,500 acre-feet, respectively. The total reserves necessary for development under the 20,000 acre-foot and 40,000 acre-foot storage allowances thus would be 788,900 acre-feet and 827,100 acre-feet, respectively (706,600 plus 82,300 and 706,600 plus 120,500). The Bear Lake irrigation reserves required for development under different allowances for storage above Stewart Dam are summarized in the following tables and on the diagrams on pages 33 and 34. The corresponding lake surface elevations also are shown in the table and diagram."

The lake surface elevations given in this table are on the same datum that is used for the existing capacity table in Bear Lake. I have forgotten whether that is Utah Power and Light Company datum or mean sea level datum; but nevertheless it corresponds to the same datum used in the present capacity table. (Confers.) Mr. Iorns says it is the Power Company datum.

Page 33--this diagram shows the reserve required for different conditions. The vertical scale represents Bear Lake storage capacity. Shown horizontally are storage allowances from zero--which would be equivalent to present conditions--

to 50,000 acre-feet. There wasn't any particular reason for extending the graph up to 50,000 acre-feet except the studies went to 40,000 and we just extended the line on out another 10,000 acre-feet. The curve which represents the size of the irrigation reserve to assure downstream irrigators of no decrease in water supply covers the full 50,000 acre-foot range of storage allowance; but the reserve capacities and the corresponding lake elevations are listed in number only for the zero, 20,000, 30,000, and 40,000 acre-foot storage allowances. This diagram really represents a picture of Bear Lake in cross-section, if you can imagine looking at the lake in that manner.

On the following page, that is page 34, is another diagram of Bear Lake irrigation reserve. This diagram is essentially the same as that on page 33; the only difference is that this diagram is on a much larger scale. On the larger scale, the size of an irrigation reserve for storage allowances other than the even 20,000, 30,000, and 40,000 acre-foot figures, could be picked off quite readily. For example now, take the 12,000 acre-foot storage allowance--which is completely out of the range of discussion on upstream storage--the reserve required for a 12,000 acre-foot allowance would be 758,000 acre-feet. If you enter the table with the 12,000 and then go over the opposite direction you can find the 758,000. That is the only purpose in making this diagram on a larger scale, is for use between the storage allowances of 20,000, 30,000, and 40,000.

On page 22:

"Effect of Storage Development Above Stewart Dam
On Power Production"

If Bear Lake storage were operated in accordance with the irrigation reserve, which would insure the irrigation interests using Bear Lake water of no decrease in water supply, the depletion in Bear Lake storage supply resulting from additional storage development above Stewart Dam would constitute a decrease in Bear Lake water supply available for power production. The estimated decreases in water supply for power production that would occur following storage development above Stewart Dam under 20,000, 30,000 and 40,000 acre-foot storage allowances are equivalent to the corresponding depletions listed in the table on page 16. As based on the 1924-1954 period, the average annual decreases in water supply for power are estimated at 13,100, 18,200, and 19,600 acre-feet, respectively, for the three storage allowances."

They are the same figures listed in the table on page 16, the depletion figures.

"The Bear Lake water supplies available for power under present conditions (average for the 1924-1954 period) and the estimated decreases that would result from additional storage development under the three storage allowances are shown in the following table and on the diagram on page 35."

The table shows substantially the same information that has been given previously in just a little different

manner. The first column represents irrigation releases, but those releases were usable for power--that is the 92,700--so that was usable for power. And then in addition there were 126,700 acre-feet of releases solely for power, making a total of 219,400 acre-feet for power, present conditions. Then towards the right-hand side of the table are listed the estimated depletions or decreases that would be made in that power supply under the conditions imposed by the three storage allowances.

The same information is brought out graphically on page 35. The diagram shows the Bear Lake water supplies available for power, that is, average annual for the 1924-1954 period. On the left or the vertical scale is the Bear Lake water supply available for power. The first bar represents present conditions; that is for a zero storage allowance above Stewart Dam. The lower part of the bar consists of the 92,700 acre-feet of irrigation releases usable for power; that is the actual release, average release, made for irrigation and used for power in the past. The top part of the bar, the 126,700 acre-feet, represents power water or the Bear Lake releases used solely for power, making the total of 219,400 acre-feet.

This diagram, like the table, is based on use of the irrigation reserve. So for the next bar, for the 20,000 acre-foot storage allowance, the irrigation release remains the same at 92,700 acre-feet and is usable for power, of course as well as irrigation. In addition there is also the 113,600 acre-feet

of water available solely for power, making a total of 206,300 acre-feet. The difference between the 219,400 for present conditions and the 206,300 figure for the 20,000 allowance, is the 13,100 acre-feet of estimated depletion as shown in Table 16.

In like manner, the next bar shows the conditions for the 30,000 acre-foot storage allowance, and the last one for the 40,000 acre-foot. In each case the difference between the total figure for the bar and the total for the bar under present conditions represents the estimated depletion shown in Table 16.

The second bar, that is for the 20,000 acre-foot allowance, represents a decrease in Bear Lake power water amounting to 6 percent. The next condition, for the 30,000 acre-foot allowance, would correspond to an 8.3 percent decrease in power water. For the last storage allowance, the estimated decrease in power water would amount to 8.9 percent--that is, of Bear Lake water for power. It does not include all Bear River water available for power at the five plants. It is just the Bear Lake storage water. It does not include the water originating below Bear Lake.

Page 23, a summary:

"This report gives the probable effects of storage development above Stewart Dam under three storage allowances (20,000 acre-feet, 30,000 acre-feet, and 40,000 acre-feet) as based on supplemental water requirements within the May 1-

July 15 period as estimated by Mr. Jibson. These effects include (1) the improvement in water supply for supplemental irrigation above Stewart Dam, (2) the depletion in water supply storable in Bear Lake and the corresponding decrease in water supply obtainable from Bear Lake, (3) the Bear Lake irrigation reserve that would be required to assure all irrigation interests using Bear Lake water of the same supply that they have had in the past, and (4) the decrease in Bear Lake water supply available for power production that would occur if Bear Lake were operated in accordance with the Bear Lake irrigation reserve. This information, in the order mentioned above, is summarized in the diagram on page 31, the table on page 16, the diagrams on pages 33 and 34, and the diagram on page 35."

I won't go back into those diagrams and the table. We have just been through them and it probably isn't necessary to go back.

THE CHAIRMAN: I think you need a 5-minute recess after that before we start questioning.

(3:25 p.m. Recess.)

(3:30 p.m. Meeting reconvened)

THE CHAIRMAN: Do the Commission members or advisers have some questions to ask Mr. Thomas? Idaho, do you want to start?

COM. COOPER: I have one question I would like to ask Mr. Thomas, and I want to say too that this was a very

splendid report, but there is a question here that I have in mind. As you increase the storage above the lake, get it up to 40,000 acre-feet, you made allowance, did you, for the reserve in the lake and increased that? Or did you set that at 5912.75 or 5914, or whatever you set it at, or a total capacity of 676,600? Was that changed, that figure?

MR. THOMAS: The 5912.75 was not used in this study. As we finally came out, without any allowance for safety factor--if that allowance were not made--this study agrees almost exactly with the 5912.75 elevation. But the 5912.75, that just happened that way; it was not used.

COM. COOPER: That was one question that I was thinking about, if you had used that.

MR. THOMAS: No, the results of this study showed that irrigation holdover, or you might call it the irrigation reserve--it amounts to the irrigation reserve--if you don't apply a safety factor, they are the same thing. I think we computed it--the figure is 676,600, is that correct?

COM. COOPER: Yes, 676,600 is the way I have it.

MR. THOMAS: That was based upon the maximum net draft on Bear Lake during that critical 6-year period, the worst that ever occurred.

MR. MERRILL: What year?

MR. THOMAS: The dates are given. It is 1930 through 1935; May 20th or 21st, 1930, through September 30, 1935--I have forgotten the dates.

COM. COOPER: Another thing I wanted to ask and get it clear: As the amount of storage capacity increased, the yield decreased, is that right?

MR. THOMAS: No.

COM. COOPER: That is, the percentage of yield?

MR. THOMAS: Yes, the percentage.

COM. COOPER: O. K. That is all.

COM. BISHOP: That is the reason why we ought to make it 80,000 upstream. (Laughter.)

MR. MERRILL: As I understand the report then, there could be no upstream storage without depleting power uses?

MR. THOMAS: I would say it this way: That there could be no additional development above Stewart Dam without depleting the water supply storable in Bear Lake.

MR. MERRILL: And that necessarily, according to your report here as I get it, would mean the depletion of water for power purposes--used for power purposes.

MR. THOMAS: That would be correct if the irrigation reserve were used.

COM. COOPER: That is the point. The irrigation reserver would protect the irrigation people but it would detract from the power uses.

MR. THOMAS: It would have to if the irrigation reserve is used.

COM. COOPER: That is right.

MR. MERRILL: So any upstream storage would be an

inroad on the Power Company rights, wouldn't it?

COM. BISHOP: Not as far as Wyoming is concerned.

MR. THOMAS: I don't believe you should ask me that question.

(Informal discussion.)

COM. COOPER: That is all the questions I have, Mr. Thomas. Is there any of you people that would like to ask Mr. Thomas a question, the Idaho people? Do any of you have any questions? (No response.)

THE CHAIRMAN: Utah.

COM. CLYDE: Mr. Chairman, I would like to ask Mr. Thomas what the maximum elevation of the lake is when it starts to spill and you can't store any more in it.

MR. THOMAS: The table gives that elevation as 5,923.65.

COM. CLYDE: Has there been any years when the lake was full and the water was running over, down the river and on into the Lake?

MR. THOMAS: Not to my knowledge.

COM. CLYDE: What about 1950 and 1952?

MR. JIBSON: We know that it hasn't been in the past 30 years. There has never been any time in the past 30 years when you couldn't put all the water available in Stewart Dam and keep it there.

MR. THOMAS: I am sure that is true for the past 30 years.

storable in Bear Lake.

"Following the previously described studies of the supplemental water supplies that could be provided by development under the three storage allowances, estimates were made of the resultant depletion in water supply storable in Bear Lake. The following table shows (1) the supply storable in Bear Lake under present conditions and (2) the estimated depletions in the supply that would result from storage development above Stewart Dam under the three different storage allowances. The depletions listed in the table were derived from storage operation data and the return flow diagram on page 29."

That is the same diagram that we looked at a few minutes ago.

If you will turn to the table that is on the following page, page 16. The first column following the water year column shows the water supply storable in Bear Lake under present conditions. Those are recorded flows. The next column shows the estimated depletion that would result from storage development above Stewart Dam under a 20,000 acre-foot allowance. For the 1924-1954 period, the average depletion is estimated at 13,100 acre-feet as shown at the bottom of the table. The next column shows the estimated depletion for a 30,000 acre-foot allowance, the average for the 1924-1954 period being 18,200 acre-feet. The last column is the estimated depletions from a 40,000 acre-foot storage allowance; the average for the 1924-1954 period, 19,600 acre-feet. These figures

MR. SMITH: I have one question if I might ask it: In your summary, No. 3, you refer to the depletion in the Bear Lake water, that it would leave the irrigation interests with the same supply they have had in the past. You mean what they actually received, not what they claimed they should receive, is that right?

MR. THOMAS: That is correct. This is based on the irrigators below Bear Lake receiving the same supplemental supplies from Bear Lake as they received in the past.

MR. SMITH: Not what the Compact has proposed?

MR. THOMAS: To my knowledge the Compact hasn't proposed anything for the downstream irrigators. I will answer the question the same way: The same supplemental water supplies from Bear Lake they actually received in the past according to the record.

THE CHAIRMAN: Coming back to Utah, have you further questions?

COM. CLYDE: Yes, I would like to ask one other question for clarification again. You remember I put a question at the beginning. I wanted to know the mechanics of computing the yield from these reservoirs.

MR. THOMAS: You are looking at the diagram on page 24, Mr. Clyde?

COM. CLYDE: Page 26.

MR. THOMAS: What we did, Mr. Clyde, is to make actually reservoir operation studies for different reservoir

capacities within any given storage allowance. Now you are on page 26, so you are on the 40,000 allowance?

COM. CLYDE: That is right.

MR. THOMAS: We made in that case, I think it was one for 20,000, one for 30,000 and one for 40,000, reservoir operation studies to obtain the yields that could be provided from each of your reservoir capacities. We ran the reservoirs in accordance with the supplemental requirements estimated by Mr. Jibson. The results were plotted to make these curves.

COM. CLYDE: Your principal difference is evaporation losses?

MR. THOMAS: Evaporation losses were taken into account.

COM. CLYDE: And administrative losses?

THE CHAIRMAN:: Both losses, administrative and evaporation?

MR. THOMAS: We didn't get down to such fine details. You realize, Mr. Clyde, that the first set of diagrams in here, pages 24, 25, and 26, were established only for selection of reservoir capacities to be used in the main study that the Commission requested. So there was no point that we could see in going to a lot of detail in these. These were merely for selection of capacity.

COM. CLYDE: Your principal difference in your yield and your capacity is as a result of your evaporation losses in the operation of the reservoir?

MR. THOMAS: Yes, and they take into account the fact that some years the water supply isn't there, you can't fill the reservoirs; and other years, the good years, you can fill the reservoirs but your requirement isn't there.

COM. CLYDE: That answers that question.

THE CHAIRMAN: Do you have other questions:

COM. CLYDE: I would like to see if this statement conforms pretty much to your conclusions: Apparently from the analysis made by Mr. Jibson this morning and you this afternoon, the operation of the Compact as proposed in the July 8 draft, any uses in the Central and the Upper Divisions will not affect in any way the uses in the Lower Division

MR. THOMAS: Irrigation uses.

COM. CLYDE: Irrigation uses.

MR. THOMAS: That would be correct.

COM. CLYDE: The second point: That the proposed storage in the upper river within the limits of your 20,000, 30,000 or 40,000 storage allowance, will not interfere with the irrigation uses below Stewart Dam so long as an irrigation reserve is provided in Bear Lake as set forth in your report?

MR. THOMAS: That is correct. It wouldn't interfere with the irrigation uses below Stewart Dam nor the direct flow rights above

COM. CLYDE: The third question then: Apparently the place where this storage upstream is going to impinge upon current uses is in the field of power; it will not affect the

irrigation or consumptive uses in any way.

MR. THOMAS: It could not if the irrigation reserve is used.

COM. CLYDE: That is right. That is all I have, Mr. Chairman.

THE CHAIRMAN: Wyoming, do you have some questions you want to ask Mr. Thomas?

MR. PERSON: Mr. Thomas, in making this storage study, if I am correct, they could store in the wintertime whenever the water supply was available, in these reservoirs you are assuming up there, is that right?

MR. THOMAS: That is correct, during the nonirrigation season.

MR. PERSON: During the irrigation season, the only time you could store is when the flow at Border was above 700?

MR. THOMAS: Dean, we used the 700 acre-foot limitation just so we wouldn't have to go to an awful amount of detailed calculations on a daily basis. As I mentioned in the report, a 700 acre-foot limitation at Border is not an exact indication of what might be storable further upstream, but it has been used in the past in other studies by Mr. Iorns, Mr. Jibson, and the Engineering Committee. They believe it to be good enough so that there will be no appreciable error by using it.

MR. PERSON: You won't be interfering with the existing direct flow rights if you use the 700, is that right?

MR. THOMAS: That is correct.

MR. PERSON: Where did that 700 come from; did you pick it out of the air?

MR. THOMAS: Not exactly. It was a figure that was just found by study and investigation that could be used as, you might call it, a rule of thumb, but a pretty good one.

MR. PERSON: But if you use that figure, if we had a limitation of a hundred thousand acre-feet of storage in the Upper Basin, we wouldn't store very much more water than we would with a 40,000 acre-foot limitation, is that right?

MR. THOMAS: The diagram on page 31 I believe shows the thing that you are getting at.

MR. PERSON: In other words, that curve would flatten out?

MR. THOMAS: That is correct. The higher the storage allowance, the curve flattens out, for two reasons: One is, in some years water is not there to store in a large reservoir; it just isn't there. In other years, your good years, the water is there to store but the need isn't there, at least it isn't very large. Those two things reduce the yield of your reservoir or the value of your reservoir. So as you go to higher and higher storage allowances, actually you don't get as much out of them in terms of percentage, as you go on up.

THE CHAIRMAN: Do you have another question?

COM. CLYDE: Mr. Chairman, may I ask another question?

THE CHAIRMAN: If you will just wait until they are

through. Let us finish with Wyoming here, see if they are through.

COM. BISHOP: Dave, do you want to ask any?

MR. MILLER: No. We were conferring on a point regarding the feasibility of holdover storage, but I don't want to bring it up.

COM. BISHOP: That is all then.

THE CHAIRMAN: You have another question, Mr. Clyde?

COM. CLYDE: Yes. Following up Dr. Person's point there on flattening of the curve on page 31, it appears from that curve that the difference in storage between 30,000 and 40,000 will not materially increase the impact on power generation. And similarly, in the curve on page 34 it shows the same thing except--well, about the same--that when you increase your storage from 30,000 to 40,000, you increase your required irrigation reserve only about 7,000 acre-feet. Apparently you could go on and on without any material increase in irrigation reserve required.

Now that is due, I presume, to the fact that there is no water to store above that point, no material amount of water.

MR. THOMAS: It is due to the two reasons I mentioned, I believe, in answer to the Dean. In the good years the water is there but the requirement is comparatively low, you don't need it. In the bad years when you need the water, the water isn't there. So that tends to bring down that yield.

The thing you are getting at there, George, I think,

is actually illustrated maybe better in Table 16 on estimated depletions. The higher you go with storage, the depletions don't increase by a corresponding amount; they flatten out also.

THE CHAIRMAN: Is that all?

COM. CLYDE: One other question: Assuming that you had a 40,000 acre-foot capacity allowable storage upstream and stored above Stewart Dam; how many years out of the record that you have been using would the reservoir fill and not be used because of lack of requirement?

MR. THOMAS: I am not sure I can answer that question without going to the supporting data.

MR. MILLER: That tabulation was made sometime back in a previous meeting, Mr. Thomas, wasn't it, Mr. Jibson's and Mr. Iorns' figures?

MR. THOMAS: Those studies would have no bearing on this; this is entirely a new study. But I think maybe you could get some information on what you are after there on your question, Mr. Clyde, by looking at the table on page 14.

THE CHAIRMAN: What about page 30?

MR. THOMAS: Page 30--that is a graphical presentation of the same table I am referring to.

THE CHAIRMAN: Oh.

MR. THOMAS: But there wouldn't be too many years, you can see in that third column, in which you would get everything out of the reservoir. There would be 1924. Now the difference between the 40,000 and 38,300, of course, is

evaporation loss.

THE CHAIRMAN: Is that the third column you are looking at?

MR. THOMAS: The third.

THE CHAIRMAN: "Direct storage"?

MR. THOMAS: "Direct storage", the third column.

COM. COOPER: What page is that?

MR. THOMAS: Page 14. There would be 1924. Now 1929--

COM. CLYDE: The question is, how many years would you keep the reservoir full without using it? You would only pull 6500 out in 1929, 7400 in 1947.

MR. THOMAS: You would pull some every year.

COM. CLYDE: Yes, but there are about six years when the draft from your reservoir would be less than 8,000 acre-feet; which would mean at least six years out of 30 you wouldn't use your reservoir very much.

MR. THOMAS: That is right.

COM. CLYDE: Now the question is: Would that reservoir be emptied that season whether you used it or not; or would it be held over until the next season? If it were held over and the next season was a normal season, then your reservoirs are full and the water has got to go down the river. So it seems to me there are some advantages to be gained by having this storage upstream, which would be offset by some of the disadvantages by losses of power generation. I don't know whether we can get that in terms of acre-feet, but it seems to

me that is material.

MR. THOMAS: There is one table that is an indication, it seems to me; that is the table on page 16, the depletion table. I can point out one thing: You will see a minus figure occurring in the last column down on the year 1948, minus depletion.

COM. CLYDE: That means you don't use any water at all, you add to it?

MR. THOMAS: That is right. That is due to this very thing, this storage operation that takes water from a good year and carries it over to a bad one and releases it and the return flow going on down the river reaches Bear Lake and actually makes the stream bigger than it was otherwise.

MR. KULP: Do you figure your return flow will get into Bear Lake?

MR. THOMAS: I didn't get the last part of your question.

MR. KULP: Do you figure the return flow will get into Bear Lake?

MR. THOMAS: Yes, we estimate it by a diagram on page 29. That is the diagram that we used in estimating the return flow to reach Bear Lake.

MR. KULP: Available for storage in Bear Lake?

MR. THOMAS: Yes --let's say it this way: It reaches storage at Stewart Dam.

MR. KULP: Well that is different. The return flow

is more likely to be used by the direct flow rights than to be stored in Bear Lake. I don't know how you can segregate it.

MR. THOMAS: I am not sure I quite understand your point there.

THE CHAIRMAN: He is asking if the return flow at Stewart Dam goes into the lake, or does it go into irrigation?

MR. THOMAS: I would say it reaches Stewart Dam and it would be available to go into Rainbow Canal and the lake. If the Idaho water master decided otherwise and took it some other place, I suppose he could do it. All I can say, I estimated it would reach Stewart Dam and be available for storage in the lake.

MR. KULP: That doesn't mean it would be available for storage in Bear Lake under priorities.

MR. THOMAS: It means about the same thing, Mr. Kulp, if it reaches Stewart Dam. Take a condition where we will say your water master would send it on down the river; what does that do? That relieves the demand on Bear Lake for supplemental storage. On the other hand, if it goes into Bear Lake, it will meet that demand for storage there. So it is six's as far as I can see it.

The point is, we estimate it will reach Stewart Dam and I don't think that makes any difference as to what disposition is actually made, whether it goes into Bear Lake or whether it goes to Lask Chance. I think that is really getting down to a specific question.

THE CHAIRMAN: Now where is Mr. Johnson? He wanted to ask a question.

MR. JERMAN: I think Mr. Clyde's question covered Mr. Johnson's.

THE CHAIRMAN: Are you finished? Have you additional questions, Mr. Clyde?

COM. CLYDE: That is all, Mr. Chairman.

THE CHAIRMAN: Does anyone else have questions to ask Mr. Thomas? (No response.) There is no one in the states and nobody in the audience. I guess that is all then, Elton.

Next on the agenda would be a statement by me of the problems to be considered at the meeting. Have you finished with the statement you had in mind making later on after we got through with Mr. Thomas' report?

MR. PERSON: Yes.

THE CHAIRMAN: You made it?

MR. PERSON: Yes.

COM. BISHOP: I thought we wanted to go on and try to determine what the storage should be before we started arguing about the other.

MR. PERSON: We have already made it.

COM. BISHOP: We haven't settled it.

MR. PERSON: No.

COM. BISHOP: That is what I wanted to do, is settle it.

THE CHAIRMAN: These are the problems as I see them

now that we are down to at the conclusion of these two reports:

1. The quantity of storage water above Bear Lake and the related question of Bear Lake irrigation reserve.

2. The division of storage above Bear Lake, keeping in mind maybe a provision on flexibility, something which will have to be discussed.

If those two problems could be settled and a decision reached on them, then I think there are two or three other problems. One is the number of Commissioners, what constitutes a quorum, and the voting rights of the state representatives. There are several problems like that to settle besides going into the details article-by-article of the Compact itself. But it appears that maybe you would not want to go down article-by-article until you cover these first two problems.

Can you settle the quantity of storage above Bear Lake, and the related question of irrigation reserve in Bear Lake, and the division of storage above Bear Lake? Those are the two things that are probably before you. (Com. Clyde leaves.)

The next question is, how do you want to handle that? Do you want to go into caucuses between states, or just how do you want to proceed? I will wait until Mr. Clyde returns and call on the states.

(4:05 p.m. Informal recess.)

(4:20 p.m. Meeting reconvened.)

THE CHAIRMAN: The Chairman is trying to find out how you want to proceed, what you want to do now?

COM. CLYDE: Mr. Chairman, I move that we take the rest of the day to meet in caucus, either separately or with the different states. Now Utah and Wyoming have some problems we would like to discuss together. And I move that we adjourn at this time so that the states can meet, and that we reconvene in the morning at 10 o'clock.

COM. BISHOP: I will second the motion.

THE CHAIRMAN: It has been moved and seconded that--

COM. CLYDE: Maybe before you put it we ought to ask these people if ten is all right. If it isn't, we can meet at nine. But I thought it would give us rather more time in the morning; that would give us a chance to meet again in the morning after we had a night to think about this thing, and come together at ten, and I believe we will make better time than if we try to go through without crystallizing our thinking.

MR. KULP: How about nine o'clock? I want to get out in the afternoon.

COM. CLYDE: Let us make it nine o'clock.

COM. BISHOP: I will go along on nine o'clock.

THE CHAIRMAN: It has been moved and seconded that we adjourn until nine o'clock in the morning to leave some time for independent caucuses. (Thereupon a vote was taken and Com. Clyde's motion carried unanimously.)

(4:20 p.m., Meeting recessed.)

Governor's Board Room,
State Capitol,
Salt Lake City, Utah
December 3, 1954,
9:30 o'clock a.m.

(All Commissioners present.)

THE CHAIRMAN: It looks like we are ready to resume the meeting of the Bear River Compact Commission. You had your caucuses last evening and this morning, I assume, among the states; and I think we will poll the states to see if you have any suggestions on procedure.

Idaho. Have you got any suggestions, Mr. Cooper?

COM. COOPER: I think we should follow the procedure that we were following last night and proceed to the matter of upstream storage.

THE CHAIRMAN; That's where we left off. That would bring us up to the quantity of storage above Bear Lake and the related question of Bear Lake irrigation reserve. Have any of the states comments or suggestions or motions to make?

COM. CLYDE: Did you call for Utah?

THE CHAIRMAN: I said we are now down to the storage of water above Bear Lake and the question of Bear Lake irrigation reserve, and I asked if the states have any comments or motions to make.

COM. CLYDE: Mr. Chairman, I would like to make a motion with relation to Article V of the July 8 draft. I move that the figure 5915.09 be inserted in line 1, Article V. A.

COM. COOPER: Line 1 of Article V. A.?

MR. SKEEN: Page 15.

COM. CLYDE: And that in line 2 of Article V. B. insert the figure 14,500; and in line 4 of Article V. B. insert the figure 40,000. And I make this motion with the understanding that Article V. B. as drawn will be rewritten as it refers to lines 6 and 7--

COM. COOPER: Lines 6 and 7?

COM. CLYDE: --of Article V. B., as it relates to the subordination of rights to store water, with the understanding that in periods of emergency provisions will be made so that all parties to storage will take proportionate reductions; and with the further proposal that lines 9 to the end of the paragraph be rewritten after further consultation between Utah and Wyoming. That is my motion, Mr. Chairman.

COM. BISHOP: I second the motion.

MR. SCALLEY: What are those figures?

COM. CLYDE: Line 1, 5915.09. That is the figure which would provide an irrigation reserve commensurate with the storage of 40,000 acre-feet as set forth in Report No. 29 in figure 33.

MR. ROSKELLEY: To reserve how much?

COM. CLYDE: To reserve 827,100 acre-feet.

COM. COOPER: Has the motion been seconded?

THE CHAIRMAN: The motion has been seconded and it is now open for discussion.

COM. COOPER: Idaho is going to especially object to the figure in line 4 of Article V. B. on the premise that we

have analyzed the situation carefully and we have decided that 40,000 acre-feet of upstream storage is altogether too high. It impairs our chances of getting our proportionate share of the water when a drouth season occurs.

We also object to the figure 5915.09 because that reduces the storage capacity of Bear Lake by about 70,000 acre-feet. Bear Lake is a natural reservoir and takes care of the flood waters. And if we permit the reserve to be increased to 5915.09 from the 5914 which we decided on at the last meeting tentatively, that is also going to work a hardship. We therefore object in both instances. There is no recognition given to the Thomas Fork storage of a thousand acre-feet in Thomas Fork.

MR. MERRILL: There is also this matter there. Subdivision B. provides that that storage--"hereby granted the right to store in any water year above Stewart Dam"--that quantity of water. The water year is defined in this Compact as being the period of time between October 1st and September 30th of the following year. That is the entire calendar year. And we feel that there can be no storage during the irrigation season when the water is needed for irrigation purposes.

COM. BLYDE: Mr. Chairman, Article V. B. (1) provides that "such additional storage right shall be subordinate. . to existing direct flow rights"; and it is my understanding that all of the flow during the irrigation season is now established covered by existing rights, and therefore would not be avail-

able for storage.

MR. MERRILL: Then why couldn't that be written so the storage would be in the nonirrigation season to avoid any misunderstanding?

COM. CLYDE: I rather think it could.

MR. PERSON: I think we would store in the irrigation season if it didn't affect direct flow rights--we would have to, otherwise there is no storage to amount to anything--during the peak flow, isn't that right?

MR. JIBSON: Yes. Our studies are based on some storage after May 1st over and above the direct flow rights.

MR. PERSON: That is right.

MR. IORNS: That was determined on the basis, as I recall Mr. Thomas' presentation yesterday, in which he called attention to the fact that this storage during the irrigation season was only stored at the time while Bear River at Border is greater than 700 cubic feet per second, which is about the flow required at Border during the irrigation season to meet direct flow rights downstream.

Could I interpose a little thing here?

THE CHAIRMAN: Mr. Iorns.

MR. IORNS: In this Article V. B., you speak in the first line of 14,500 acre-feet. Now that is 14,500 acre-feet of reservoir space; that is not water. The average amount of water that you get out of the 14,500--or out of that constructed 14,500 acre-feet is probably 50 percent or less, in quantity of

water you get from it. Some of the reservoirs get pretty close to one acre-foot of delivery for one acre-foot of space. But most of those in that 14,500 it takes more than one acre-foot of space to yield an acre-foot of water.

Continuing on there, this additional right that you have set up there is identified as water. Now that is consumptive use of that much water. It is going to be an awfully hard thing to measure, in fact it is practically impossible. If that second figure was identified as space, giving the upper people the right to construct so many thousand acre-feet of space, with their yield from that space they may in some of the tributaries have to construct a considerable amount of space in order to get just a small yield of water. The economics of the situation will determine just what they will build. And I would suggest that both of those figures in that paragraph be identified as storage space.

I would like to call your attention to Mr. Thomas' study that he presented yesterday in which 40,000 acre-feet of space, if it were set up as 40,000 acre-feet of space above Woodruff Narrows, would only amount to approximately--

COM. CLYDE: 25,000 acre-feet of yield.

MR. IORNS: --25,000 acre-feet of yield. Now 25,000 acre-feet of yield is the amount of water that is going to affect you down below; the space is not going to affect you downstream. It is the yield of water that will affect you, not the space. And Mr. Thomas' study showed that with the

construction up there, after it gets even above 40,000, they can construct a lot of space but their yield is very small in proportion to the space they have to construct.

And I think by changing it to acre-feet of space, it would give the other people the objective for which they are striving and would also be something that would be easier to administer and keep track of in the years to come, and control, and be less damaging to the people on downstream on what it could possibly amount to at sometime in the future.

COM. CLYDE: Mr. Chairman, may I ask Mr. Iorns a question?

THE CHAIRMAN: Yes.

COM. CLYDE: What is your interpretation of the meaning of the term, "storage allowance", as compared to what you have been talking about here?

MR. IORNS: The way the Compact is written now in that particular paragraph it isn't clearly identified; it can be one or the other. For instance, back on page 2, Article II, it identifies additional storage, "means storage in reservoirs constructed subsequent to" a certain date. Now it should be identified there, the way I look at it. Is that storage for consumptive use of a certain amount, or is it storage space? Now if that were identified as storage space in that definition there and then over in the table again--but I believe the way it is written, it is not a clear definition of what you are giving here.

The first part where it says 14,500 "acre-feet in the aggregate", that is 14,500 acre-feet of water; that is not 14,500 acre-feet of water for consumptive use. There is a difference, a tremendous difference in the two of them. Likewise on down there in the 4th line, as I would read that the way it is written, it is 40,000 acre-feet of water, not 40,000 acre-feet of space.

MR. PERSON: I would like to talk about this space for a minute. We are not interested in space. It is possible Mr. Myers might want to build a reservoir to store 10 acre-feet; but because of the economics of the spillway and so forth, he might have a hundred acre-feet of capacity. Would that be included?

MR. IORNS: It would depend on what you set your figure for. I think it would be far better, it is entirely my personal opinion. And if that figure was set at 40,000, 50,000 acre-feet upstream, I don't believe the people downstream would suffer any more than the relation that Mr. Thomas showed in his studies of it, as far as the amount of water is concerned.

COM. BISHOP: I would like to ask Mr. Person a question on this; this was brought up the other day. How would you figure within your own state how much of the state's allocation was used on that reservoir of Mr. Myers where he has a capacity of so much?

MR. PERSON: We would measure the water that goes

into the reservoir.

COM. BISHOP: On an average?

MR. PERSON: The maximum. Say we were allocated 30,000 of this 40,000 in Wyoming. We would measure the amount of water we stored every year, and we could never store any more than 30,000. But the space completely upsets any possibility at all--

COM. BISHOP: I don't think you can limit the space. The Court has ordered on the North Platte that we not store to exceed 18,000 acre-feet in any one year. All right, we read those reservoirs on the first of each year and we have got over 30,000 acre-feet of capacity but still we have never gotten up to the 18,000. Don't you see, there are some reservoirs that don't get any water one year and another. You can't limit space.

MR. PERSON: We might double the space and save money on the spillway. It might be practical from this Compact standpoint if you want to keep us from getting water, to give us space, that is all you give us.

COM. BISHOP: You would have to designate where that space was, which you would have to do eventually. There are a lot of years that some reservoirs don't get any water.

COM. CLYDE: Mr. Chairman, let us read that sentence again, beginning in the 2nd line of Article V. B. where it says: "there is hereby granted"--

COM. BISHOP: Just a minute.

COM. CLYDE: --"the right to store in any water year

above Stewart Dam for consumptive use 40,000 acre-feet, and no more;". Now this water we put in storage, whether it is used consumptively or not is not important, it is used. Part of it goes into the atmosphere from surface evaporation, but as far as the impact on the lower area is concerned it is used, subject to returns that might come as a part of the use. But it seems to me that we have got to stick to a quantity which is allowable for storage in any one year and not be tied up.

COM. BISHOP: Whatever the amount of acre-feet held over is, certainly that much we are entitled to more for that year.

COM. CLYDE: It seems to me that that statement there is sound. I agree that we should have a clarification of definitions. But what we are asking for here is the right to store in any one year.

MR. PERSON: Not more than 40,000--it is that simple.

MR. MERRILL: Do you mean by "consumptive use" the water actually used, and thereby they would have a right to store in addition to the 40,000 acre-feet, the evaporation losses?

COM. CLYDE: No, that is the reason I made that point. The consumptive use is within the 40,000; the 40,000 includes all losses and consumptive use.

MR. MERRILL: Why limit it to consumptive use?

COM. CLYDE: The language says there it shall be stored for consumptive use rather than non-consumptive use; I

think that is the meaning of it. We are going to use it consumptively rather than non-consumptively. In other words, we aren't going to put water in these reservoirs to make power out of it alone; so it says it will be for consumptive use.

COM. BISHOP: I wonder if that "consumptive use" can't go out, because if it is Wyoming's water and they want to use some for power, that is all right.

MR. MERRILL: That would be all right but it wouldn't be all right to use it down below. How do you arrive at the figure, 5915.09?

COM. CLYDE: Mr. Merrill, I took that figure off the curve on graph No. 33. Look at the graph on page 33, and also on page 21. That is the elevation of the lake for an irrigation reserve of 827,100. And we were told yesterday that is the Utah Power and Light datum, that elevation.

MR. MERRILL: That is what?

COM. CLYDE: We were told that that elevation is by the Utah Power and Light datum; that is their gage.

MR. MERRILL: I think their datum is 5914.5.

COM. CLYDE: As per their bench mark. We use their datum. The figure you wrote is for 20,000 acre-feet.

MR. IORNS: May I point out another thing to Mr. Clyde: The figure you have given there is the Bear Lake reserve required for the full development of this 40,000 acre-feet upstream. According to Mr. Thomas' figures yesterday, I think that would be 40,000 acre-feet of space.

COM. CLYDE: Not, as I understand it.

MR. IORNS: However, it is for the total full development. We know at the present time--or rather our studies show--that the present reserve that is necessary in Bear Lake under existing conditions is about 706,000 acre-feet. Wouldn't it be advisable to identify it in that, under existing conditions, and a reserve of so much to be included as the upstream storage increases in relation to Mr. Thomas' curve here, as it goes up. Or you could set it up by certain stages of amounts and procedural to that development in any of those stages.

COM. CLYDE: What you are saying is that the reserve would increase as the storage was developed.

MR. IORNS: Yes.

COM. CLYDE: I think there would be no objection to that as I see it.

COM. COOPER: Every time you increase the amount of reserve, increase the level of the lake, you are reducing the storage capacity of the lake, aren't you?

COM. CLYDE: For what purpose?

COM. COOPER: For all purposes, for irrigation as well as power.

COM. CLYDE: Irrigation and power.

COM. COOPER: Why certainly. Say you set a figure at 5920; then you have only got 3.65 capacity left, haven't you? Likewise, if you increase from 5914, which was tentatively

agreed upon last time, to 5915.09, you reduce the storage capacity of the lake, don't you? And if you reduce the storage capacity of the lake for power, you also reduce it for irrigation, don't you?

COM.CLYDE: Mr. Chairman, may I answer Mr. Cooper?

THE CHAIRMAN: Mr. Clyde.

COM. CLYDE: Fred, if you will let me, I will back up a little bit and try to explain the position I took there.

COM. COOPER: All right.

COM. CLYDE: This position is based on the two reports submitted yesterday, which apparently are the last word in the analyses of data pertaining to the Bear River. And these two reports indicate that as you increase the storage above Bear Lake, you cut down the storage available in Bear Lake. We admit that.

However, we feel that consumptive uses are paramount and the first objective in this whole situation is to protect and provide for the consumptive uses of water. And in order to provide the storage necessary in Bear Lake to protect existing rights to consumptive uses, it is necessary that we reserve in Bear Lake a given quantity of storage; and that quantity of storage necessary for the reserve increases as you increase the storage above Bear Lake. The analysis that was made involved three storage allowances, 20,000, 30,000, and 40,000 acre-feet. It was found that as you increased the storage allowance above Bear Lake from 20,000 to 30,000 acre-

feet, you increased the required irrigation reserve quite a substantial amount. As you went from zero to 20,000 you increased it substantially; as you went from 20,000 to 30,000 you increased it less in proportion; and as you went from 30,000 to 40,000 you increased it very much less.

Now by increasing that irrigation reserve up to the elevation specified, namely 5915.09, representing an irrigation reserve of 827,100 acre-feet, there would be sufficient water in Bear Lake to fully protect the consumptive users below Bear Lake for the worst series of years that has been experienced since records have been kept. So that from that point of view, we could say we have fully protected the rights to the consumptive uses below Bear Lake and also provided for a storage allowance of 40,000 acre-feet above Bear Lake.

Now what does that do to the power? The water out of Bear Lake, a portion of which is used and will be used for power purposes only, will necessarily be decreased. I don't think anyone has ever argued any other way. And the decrease as you go from zero to 20,000 acre-feet of storage allowance upstream is substantial. It becomes much less in proportion as you go from 20,000 to 30,000, and from 30,000 to 40,000, due to the fact that this curve flattens out very rapidly and you get a very small increase. I think it is on the order of 1140 acre-feet, or some such--1100 acre-feet. But the figures are in the report.

Now that means this: That an authorization to increase

the storage upstream from Bear Lake, provided we establish this irrigation reserve, will not interfere with or affect adversely the downstream consumptive uses, but it will interfere with and affect adversely the uses for making power or the nonconsumptive uses.

MR. MERRILL: Haven't they some rights to be considered?

COM. CLYDE: That is right. I am coming to that. Whatever their rights are, I am just pointing out that there will be an impact on them. I don't think anybody has ever denied that there will be an impact on them, whatever they are. We are not admitting any rights or denying any rights, whatever they may be.

MR. MERRILL: They have been adjudicated by the Federal Court.

COM. CLYDE: Yes, but all the states were not parties to it.

MR. MERRILL: That may be, but so far as Idaho and Utah are concerned, they are adjudicated.

COM. CLYDE: Not as far as the upper basin in Utah, and therefore I have to put it that way. I don't know what the final court would say; but at least we can say that as of this moment, the Upper Utah users and the Wyoming users are not bound by that decree.

MR. SMITH: Perhaps they are not bound.

MR. MERRILL: I think there is a serious question

there.

COM. CLYDE: I am not an attorney and I can't answer that. I am going to put it that way: Such rights as there are, whatever they may be, there is going to be an impact on them, there is no question about it.

But my point is this: That any stream to be fully developed should be developed from the top down, because the water runs downhill and the residues move down. You never can move water back upstream but you can always move it downstream, regardless of the situations that arise. Our experience on the Sevier River, if I may point it out as an example, is this: That it is frequently operated so that water which belongs to and under other conditions would be stored in the Sevier Bridge Reservoir is actually stored in the Piute Reservoir some hundred miles above. When the time comes to use that water, it is taken out of the Piute Reservoir and brought down to the lower river where it belongs; and that provides for maximum use because we fill our upper reservoirs first and come on downstream, and when the last one is filled they are all filled and the residue goes into Sevier Lake.

That is the way we should operate Bear River. We should operate it so that the last reservoir in the system before it dumps into the place of non-use would be the last one to fill. I don't say the rights establish upstream; I say they establish where they are. That is the reason I think these three states would benefit materially if they would permit the

maximum development of upstream storage within the limits of the conditions under which they have to operate.

Now it is true there will be an impact on the power. The question then is: Is the impact on the power, which is a non-consumptive use, sufficient to overshadow the benefit which will accrue as a result of that development upstream? And from the reports which were submitted yesterday, it is my personal opinion that the greater benefits in the long run will accrue if we establish upstream storage to the limit of the available water supply, and that is indicated in this report to be about 40,000 acre-feet.

That is my reason for making that motion.

COM. COOPER: Mr. Chairman, may I ask another question?

THE CHAIRMAN: Mr. Cooper.

COM. COOPER: The report, when the storage amounted to 20,000 acre-feet, showed an average yield of 9,000 acre-feet. When the storage was 30,000, it showed an average yield of 14,000. And when your storage was 40,000, it showed an average yield of 15,500--

COM. CLYDE: No.

MR. IORNS: Twenty-seven or eight.

COM. CLYDE: About twenty-seven, I believe, or twenty-five.

COM. COOPER: Where are those figures?

THE CHAIRMAN: What page, Mr. Thomas?

MR. THOMAS: I believe it is on pages 12, 13, and 14. If you want it on the graph it would be on page 31.

COM. COOPER: Is that over a 10-year period? Page 27, you say?

MR. THOMAS: Page 31, the graph.

COM. CLYDE: Pages 12, 13, and 14, I think give it more specifically. Page 12 is for 20,000 acre-feet, showing a total yield of 15,300 for the 1924-54 period; it gives you 13,400 direct storage releases and 1900 usable return flow. The next page, 30,000, gives you 19,500, 2,600, for a total of 22,100. And the next page gives you 22,000 plus 2700, a total of 24,700; so for a 40,000 acre-foot allowance the net yield would be nearly 25,000 acre-feet.

COM. COOPER: That is an average for the 30 years, is that correct?

COM. CLYDE: That is an average of the record.

MR. IORNS: I can't help but bring this point back again, that this 40,000 acre-feet as set up here in Mr. Thomas report is 40,000 acre-feet of space. The depletion computed-- as the effect of that at Bear Lake--is the depletion that would result from the yield that you would get from that 40,000 acre-feet of space, not from 40,000 acre-feet of water each year. Elton, will you straighten us out on that?

MR. THOMAS: I believe I would say it a little differently, Vaughn. I would say those yields would result from the different quantities of storage allowance; not space,

storage allowance.

COM. CLYDE: In other words, that storage allowance is the maximum amount of water that you can store in any one year. It never can exceed 40,000 but it may be anything less than 40,000 depending on what is available to put in storage. And the fact that it is less than 40,000 on an average, on the average the actual storage would be less than the storage allowance.

MR. SMITH: By that you mean if they had 20,000 left over, they could add another 40,000 to it the next year?

COM. CLYDE: Say that again.

MR. SMITH: If they had 20,000 acre-feet of water left one year in storage, they could add another 40,000 to it the next year; and then if they had 40,000 left, they could add another 40,000 the next year? Or could they only have a total maximum storage at any one time of 40,000 acre-feet?

COM. CLYDE: The way it is drawn now--

COM. BISHOP: I say that is not the way I understand the intent of the Compact. We can store only so much in any one year. Anything we have got held over we can store the next year and whatever the amount of the allowance is.

MR. MERRILL: That is what I said.

COM. BISHOP: You have got to have some holdover space and holdover storage up there. We are 50 percent short of water now on our irrigation. We will still be quite a lot short after we get this allowance.

MR. MERRILL: Assuming you get this allowance.

COM. CLYDE: I might add to that, the hydrologic studies indicate that the holdover storage is not going to be very much--

MR. PERSON: That is right.

COM. CLYDE: --just from the nature of the thing.

MR. PERSON: We are going to need it every year.

COM. CLYDE: Let me give you some figures here. Take page 12 again. If we build this to a storage allowance of 20,000 acre-feet, we would be able to satisfy only 47 percent of our water requirements. If we build it to a storage allowance of 30,000 acre-feet, we will be able to satisfy 68 percent.

COM. BISHOP: Provided you get the water.

COM. CLYDE: This is based on past records, Clark.

MR. PERSON: The water we got.

COM. CLYDE: The water we actually got during the past record. If we got this 40,000 acre-feet allowance, we can satisfy 76 percent of the water requirements. But you see we can never get to a hundred even with the maximum. Most of these years--18 out of 30 to be exact--we can supply a full amount; so 12 out of 30 years we never can reach that. So at least 12 out of the 30 we would empty completely, and the other 18 out of 30 would come pretty close to emptying.

MR. PERSON: For the amount of water we can't afford to do it. I don't think it is a problem at all, but again I don't think we ought to be limited.

COM. CLYDE: Here is the situation on holdover storage: If you could afford to build it big enough and use that to supplement Bear Lake storage--because during wet years we don't need the water anyway--we would come through the end of the year with a full reservoir, and no draft from the reservoir, and come into the next winter season with a full reservoir, and then you can't put any more in it. So under some conditions, like 1952 and 1950, when Bear Lake is full, that water that spills over goes into the Lake. But if we had 40,000 acre-feet above, we would have 40,000 acre-feet more storage and it would accrue to the lower users. It couldn't help us by virtue of the fact it couldn't be held up there. It has got to run downhill, and if Bear Lake is full, it has got to go on down.

COM. COOPER: Mr. Chairman, I move that we recess for 15 minutes.

COM. BISHOP: Second the motion.

THE CHAIRMAN: It has been moved and seconded we recess for 15 minutes. (Thereupon a vote was taken and Com. Cooper's motion carried unanimously.)

(10:13 a.m. Recess.)

(10:42 a.m. Meeting reconvened.)

THE CHAIRMAN: Has any one of the Commissioners any suggestions or further discussion?

COM. COOPER: Idaho has a counter proposal. Of course as long as this motion is before the house--

MR. MERRILL: You might amend it.

COM. COOPER: If we can amend the motion of Dr. Clyde, if that is agreeable?

COM. CLYDE: I suggest you propose your amendment, Fred.

COM. COOPER: We propose that line 1 of Article V. A. shall read, 5914.5; and that line 4 in Article V. B. shall read, "30,000 acre-feet, and no more".

THE CHAIRMAN: That is an amendment to Mr. Clyde's motion?

COM. COOPER: And that "there is hereby granted the right to store annually above Stewart Dam for consumptive use"

COM. CLYDE: Does that mean you put the word "annually" in place of "any water year"?

COM. COOPER: Yes. I have a question to ask in connection with this 14,500, this existing storage approximating 14,500. Where are those figures, Mr. Jibson?

MR. JIBSON: They are in Report 22, if that is what you are referring to, Fred.

MR. IORNS: You want those various reservoirs and their capacities read into the record here?

COM. COOPER: Yes.

MR. IORNS: There is quite a bunch of little reservoirs.

COM. COOPER: We are concerned mostly about the Neponset Reservoir.

MR. JIBSON: That figure includes the Neponset Reservoir.

MR. MERRILL: Space or water?

MR. JIBSON: This is space; this is capacity.

MR. MERRILL: Then that 14,500 is all capacity and not acre-feet?

MR. JIBSON: Acre-feet of capacity, up to the spillway.

MR. MERRILL: The total capacity ought to be in there.

MR. JIBSON: We have no way of knowing on a reservoir.

COM. COOPER: That means all the reservoirs including Neponset?

MR. JIBSON: That includes all the reservoirs above Bear Lake; all existing reservoirs above Bear Lake.

COM. BISHOP: I would like to know if they have taken into consideration the permits that are in good standing.

MR. JIBSON: They have not been included as existing reservoirs if they have not been built.

COM. BISHOP: They ought to be included if they have a permit. There are not many of them but--

MR. MERRILL: They come out of that additional storage.

MR. JIBSON: In further answer to your question, Neponset Reservoir is 6,900, existing capacity.

COM. BISHOP: A permit that has been issued is an existing storage right.

MR. IORNS: Which one is that you are speaking about now?

COM. BISHOP: Any reservoir that has been allowed and they haven't built it yet, but it is in good standing on our records. That is an existing storage right.

MR. JIBSON: It is an existing right but they asked us to give them a record of the existing reservoirs.

COM. BISHOP: That is different.

MR. JIBSON: And this survey was made in the fall of 1951 and I checked every existing reservoir above Bear Lake, and where necessary I mapped it for capacity. But I did not check existing permits in this study because it was definitely asked that we come up with a figure on existing storage capacity.

MR. IORNS: Mr. Bishop, there are entirely too many of these things on which just initial permits are issued which are nothing more than a gleam in somebody's eye. It would be impossible, I think, to include such a thing in here at this time unless it is existing.

THE CHAIRMAN: Back to Mr. Cooper.

COM. COOPER: Furthermore, we want to make it clear that in making this proposal, we do not feel that we have the right to give away anyone else's water, the storage water, for example, which the contractual users in Bear River Valley and the Utah Power and Light have the first rights to; and we would reserve the right to get their consent. If you people feel to accept this proposal, we must get their consent before we can grant it.

THE CHAIRMAN: The rest of you understand his motion

to amend Mr. Clyde's motion without repeating it?

COM. COOPER: We reserve the right to approve or reject the language that Mr. Clyde proposes in his amendments to this article.

COM. CLYDE: I don't quite understand that. You are referring to the language relative to the sliding scale in periods of emergency?

MR. MERRILL: You made various suggestions as you will recall, proportionate reductions and so forth. We want time to study that.

THE CHAIRMAN: I will ask the other two states if they understand your amendment. You haven't a second yet.

COM. CLYDE: Mr. Chairman, after our conversation here between Mr. Cooper and myself relative to these two motions, I would like to make this suggestion for your consideration: My motion covered three points, first the total storage allowance, the existing storage, and then some change in language relative to the subordination of storage rights. I am afraid it is a little confusing, especially in view of the amendment which says, "We reserve the right to modify the language." In other words, we are voting on something that we haven't clarified or specified specifically. I am wondering if it wouldn't be better to withdraw both motions and make a new motion covering only the storage--

THE CHAIRMAN: Yes, divide it into two motions.

COM. CLYDE: --and then make as many additional

motions as we wish to cover the other points. Does that sound reasonable?

COM. COOPER: I will withdraw the amendment.

COM. CLYDE: I will withdraw the motion with the approval of the second.

COM. BISHOP: I will withdraw the second.

THE CHAIRMAN: All right, we start over.

COM. CLYDE: Mr. Chairman, I move that in line 1 of Article V, Section A, we insert the figure, 5915.09; and in Article V, Section B, line 4, we insert the number, 40,000. And I think we had better include the existing storage, because that is part of it. And in Article V, B, line 2, insert 14,500.

MR. MERRILL: I would like to verify that. I never heard that figure before.

COM. CLYDE: May I ask, Mr. Chairman, for clarification on that figure of 14,500. It is my understanding that is the measure of all of the reservoirs that are now in existence.

THE CHAIRMAN: That was gone into in one of the previous meetings, I don't know which one.

COM. CLYDE: I have a summary here from Report 22 which says it is 14,000.

MR. MERRILL: That is the largest figure I ever remember hearing.

THE CHAIRMAN: We can ask for an explanation from Mr. Jibson.

MR. JIBSON: I might clarify that a little bit. I

tabulated the adjudicated rights and I also tabulated the existing capacity in Report 22. The adjudicated rights totaled 14,315. The existing capacity totaled 14,595, which included one reservoir of 66 acre-feet having the right to fill ten times annually. We recommended that that 660 acre-feet then be reduced to 66 acre-feet, which would give us approximately 14,000 acre-feet of existing capacity.

COM. CLYDE: With that explanation, Mr. Chairman, I will change that figure to 14,000, with the approval of the second.

MR. MERRILL: Then that would be space instead of acre-feet?

MR. JIBSON: It is still acre-feet, the capacity. It is space but it is in acre-feet.

MR. MERRILL: I don't understand the two terms.

MR. PERSON: I think what you are trying to do is recognize in that existing rights that are already constructed; and I think the safe way to do it is to name the reservoirs with their capacity.

MR. JIBSON: You mean for the record today? We have them individually.

MR. PERSON: I think it should be in the Compact.

MR. JIBSON: In the Compact.

MR. PERSON: If that is really what you want to do. I think Dr. Bishop wants to recognize the rights in good standing in your office too. Is that right, Clark?

COM. BISHOP: What I would like to do is to cut out "approximating _____ acre-feet in the aggregate", the whole thing, and have it read, "In addition to presently existing storage rights above Stewart Dam." Because any right that has been issued by our office or by any of the other offices has established a priority there.

One of these I have in mind, a gentleman called my attention to, is this Etcheverry Reservoir. That is half for Idaho and it has been allowed by our Legislature. Actually it hasn't been built but it establishes a priority and it should have its water, and every other right should be recognized. That is the way we have done in these other compacts and I don't see any reason for making an exception in this.

COM. CLYDE: If that were done, Utah also has a lot of applications for storage rights and that completely upsets the whole works.

COM. BISHOP: That is what I am objecting to.

MR. MERRILL: Then we are reducing the 30,000 if you increase the 14,000?

COM. BISHOP: We might reduce the 40,000.

MR. JIBSON: I would like to call your attention to another inconsistency in that first sentence. "In addition to presently existing storage rights" --we have there--"above Stewart Dam, approximating 14,000 acre-feet. ." It so happens that the total of either ^(rights or capacity) does approximate that as we found them at this time in 1951. But that word "rights", if you adopted

Mr. Clyde's motion to insert 14,000 there, should be changed to "existing storage capacity"; because if we leave it as is and say "existing storage rights", then we have ~~get~~ to include all the rights that are on record as of a certain time whether it is built or not.

MR. PERSON: I think what you want to do is insert the words, "constructed reservoirs". I think you have got to say, "rights in constructed reservoirs as of" such-and-such a date; and then rather than name the reservoirs in the Compact, they could be in the record, the minutes. A hundred years from now or 50 years from now, nobody would know from the way it is now what we were trying to do.

MR. JIBSON: My point is, in order to be consistent with the 14,000 that he suggested be inserted, we will have to change that wording.

MR. PERSON: What we intended to do in that was, "in constructed reservoirs as of" such-and-such a date.

MR. JIBSON: That is right.

THE CHAIRMAN: Back to you, Mr. Clyde, on the completion of your motion.

COM. CLYDE: I think the intent there was to recognize the rights in reservoirs that are currently constructed.

MR. PERSON: That is right.

COM. CLYDE: And if that amount is 14,000 acre-feet, then I think we could specify it that way. Or if you want to add the phrase, "in constructed reservoirs above Stewart Dam",

we could strike out the reference to quantity

MR. PERSON: That is what I feel it should be, "in constructed reservoirs on" such-and-such a date,

COM. BISHOP: Mr. Chairman, may I ask a question of Mr. Clyde--it would pertain to the State Engineer more than Mr. Clyde--just how he would administer the water in his state. For instance, I believe there are one or two reservoirs built in the last couple of years in this water shed that received their permit for a priority in 1952. We have got others that are granted with a priority of 1950 that intend to go ahead and build them provided the Power Company will let them. Now they go ahead and build this reservoir under the permit. Just how are they going to administer the reservoir? Is this man with the 1952 priority going to be ahead of the fellow with the 1948 priority?

COM. CLYDE: I think it comes right back--maybe Mr. Tracy can help me out on this--it comes back to the condition that existed when this Compact was proposed. Now we have one reservoir here in Utah, Woodruff which is on Birch Creek, which was under construction at the time the question was raised; it was partially built at the time the question was first raised. No other reservoirs that have been applied for and whose applications are in good standing are included in that list as far as Utah is concerned, only the reservoirs that are physically constructed.

It seems to me these applications for storage in

both states would have to come out of the 40,000 acre-feet or whatever amount is finally agreed upon for additional storage. And therefore, we should specify that in addition to the currently existing storage rights in constructed reservoirs--

MR. MERRILL: Approximating so many acre-feet?

COM. CLYDE: You can say, approximating so many acre-feet--I think that would clarify it.

MR. MERRILL: Or not exceeding so many?

COM. CLYDE: And then everything in addition to that would come out of whatever allocation is made.

In order to get the matter before the Commission--

MR. MERRILL: Pardon me, Mr. Clyde. Do you know what that figure would be for those constructed reservoirs?

COM. CLYDE: The report that I have here shows a total of 14,000 acre-feet.

MR. MERRILL: Of constructed reservoirs? I thought that contemplated reservoirs they expected--it took in those for which permits had been made.

COM. CLYDE: These are all constructed.

THE CHAIRMAN: I would like to call the Commission's attention to the definition over here in Item 6 of Article II where you refer to "Additional storage"--"means storage in reservoirs constructed subsequent to" a certain date, and that ties in too.

COM. CLYDE: Mr. Chairman, a point has been raised here that may help answer Mr. Merrill's question. One reser-

voir, the Myers Reservoir on Mill Creek, 416 acre-feet--now that is in Wyoming--has that been built, Mr. Bishop?

COM. BISHOP: Mr. Myers?

MR. MYERS: Yes. It is a larger capacity than that though. I think it is 560.

MR. PORTER: It is not included in the total?

MR. IORNS: Mr. Myers, according to our tabulation, has an issued right for 556.5; that is the paper right, you might say, that has been granted by the State. In our approximate survey of the reservoir capacity, it was estimated at the time of the survey there was a capacity of 140 acre-feet, and it was not completed at that time. The notation is in the table here that the reservoir was not completed at that time.

COM. CLYDE: That 140 and 416 makes the total of 560. But that reservoir has been constructed now?

MR. MYERS: Yes.

MR. IORNS: To its enlarged capacity?

MR. MYERS: Yes.

MR. IORNS: It is completed now and its capacity is 556.5?

MR. MYERS: Yes.

MR. JIBSON: Incidentally, when I inspected that reservoir there was equipment on the site at that time; they were working on it. That is why I didn't survey it, but I made an estimate of the capacity at the time because they had been working on it just previously and there was still some

equipment at the site. And for that reason we used an estimated capacity and noted that it wasn't completed. So if that has been completed and has been increased--

MR. MYERS: I completed it about a year ago.

MR. JIBSON: --of course that would be added to this -- but not as of the time of this report.

THE CHAIRMAN: Isn't it possible to arrive at the substance of this and leave a lot of these details to be worked out? You have got a lot of them to work out anyway.

COM. CLYDE: My recommendation now then, Mr. Chairman, and I will finish my motion now--I will repeat it:

I move that in Article V.A., line 1, the figure 5915.09 be inserted; that Article V.B., lines 1 and 2, be made to read as follows: "In addition to presently existing storage rights in constructed reservoirs above Stewart Dam, approximating 14,500 acre-feet capacity in the aggregate, there is--"; and in Article V.B. line 4 following the words "consumptive use", insert 40,000.

THE CHAIRMAN: You have heard Mr. Clyde's motion. Is there a second?

COM. BISHOP: I will second it.

THE CHAIRMAN: You have heard the motion and the second by Mr. Bishop. All those in favor say "Aye."

COM. COOPER: Idaho still--

THE CHAIRMAN: Excuse me. I shouldn't start it that quick.

COM. COOPER: Idaho still registers an objection. We feel to amend the motion. We still contend that 5914.5 in line 1, Article V, Section A, and in line 4, Section B of Article V, 30,000 acre-feet and no more, is the limit to which we feel inclined to persuade the people that have the first storage rights to go on this proposition.

THE CHAIRMAN: You have heard Mr. Cooper's amendment. Is there a second?

MR. KULP: I will second it.

(General discussion.)

COM. BISHOP: I will second the motion if you will amend Section B on page 15 to recognize all existing storage rights.

COM. COOPER: "Approximating 14,000" as Mr. Clyde said? I am perfectly willing to make it 14,000.

COM. BISHOP: I will go along the way it is. I suppose I will have to go along with that if we get the 40,000, but I won't be very happy about it.

THE CHAIRMAN: You had better state your amendment to Mr. Clyde's motion again. It has been seconded by Mr. Kulp. Will you please restate it so we have got it clearly before it is voted on or discussed further?

COM. COOPER: The amendment is as follows: In Article V, Section A, line 1 shall read, "The water of Bear Lake below elevation 5914.5"; and in line 2, Article V, Section B, "approximating 14,000 acre-feet in the aggregate"; and line 4,

Article V, Section B, "consumptive use 30,000 acre-feet, and
ore."

THE CHAIRMAN: Is it understood that you are amending
Mr. Clyde's motion concerning the 14,000 acre-feet then, because
he used the same figure.

COM. CLYDE: I used the same figure.

COM. COOPER: We will agree to that 14,000 acre-feet
in the aggregate.

COM. CLYDE: Mine was 14,500, so it would be an amend-
ment.

THE CHAIRMAN: It has been moved and seconded by Mr.
Kulp. Now the discussion.

MR. PERSON: I don't know if this is a filibuster or
not, but it seems to me you vote on the original motion; it
takes all three states to accept it. I am a little surprised
by the filibuster and the second of the motion by Mr. Kulp.

(General discussion.)

THE CHAIRMAN: If it isn't unanimous, I assume we are
nowhere.

MR. MERRILL: That is right.

MR. PERSON: That is why it seems to me we might as
well vote on Dean Clyde's motion.

THE CHAIRMAN: We have this amendment to vote on
first. You have heard--

COM. CLYDE: Mr. Chairman, may I ask a question for
clarification?

THE CHAIRMAN: Yes, sir.

COM. CLYDE: Mr. Cooper, your figure, 5914.5, provides for an irrigation reserve of only 20,000 acre-feet based on the analysis. I was just wondering if that is the figure you wanted there.

COM. COOPER: 5914.5 is the figure we agreed upon at the previous meeting before this study was made. You know, Mr. Clyde, that we agreed a year ago on the 5912.75. That has been adhered to ever since and it has proven sufficient. We haven't had any difficulty in connection with the administration of the lake, and we have all gotten water at all times. When we needed to we have been able to draw on the lake.

I can't see the consistency at this time of increasing this amount and thereby reducing your storage capacity of the lake, which you will do in case of a flood. In case of a flood, then your capacity is reduced if you increase the required amount to be placed in the lake to insure the delivery of the water downstream.

COM. CLYDE: You have answered my question by saying that that represents 20,000 acre-feet of upstream storage. Now I would like to point out that there is capacity in the lake above 5915.09 in the amount of 594,000 acre-feet; so that that cutting into the capacity is not too serious.

MR. MERRILL: But it is that next provision, if you will notice. When the lake is below that figure the company can't use it for power purposes.

COM. CLYDE: That is right, when it drops below.

MR. MERRILL: That is where the difficulty arises.

COM. CLYDE: For power purposes only.

MR. MERRILL: Yes.

COM. CLYDE: The question is answered. 5914.52?

MR. MERRILL: .50.

COM. CLYDE: 5914.50 is the figure for 20,000 acre-feet of upstream storage. Question on the motion.

THE CHAIRMAN: Now, Mr. Cooper, the Chair can't see progress will be made by voting on your motion since it was not seconded by one of the other states; but if you desire the Chair to go ahead. I will go ahead and call for a vote on your amendment. It was seconded by Mr. Kulp.

MR. KULP. We had the same situation arise in the Columbia Interstate Compact Commission meeting and the Chair ruled that a second was permissible by another member of the delegation. You can make your own ruling.

THE CHAIRMAN: I said if Mr. Cooper desired I would go ahead and call for a vote. So I assume from that that you do.

COM. COOPER: Certainly, we just want to know where you stand.

THE CHAIRMAN: You have heard Mr. Cooper's amendment seconded by Mr. Kulp. I will call for a vote in the reverse. Wyoming?

COM. BISHOP: No.

THE CHAIRMAN: Utah?

COM. CLYDE: No.

THE CHAIRMAN: Idaho?

COM. COOPER: Aye. If the cards are stacked against us we might as well put them face up.

THE CHAIRMAN: Now we will go back to Mr. Clyde's motion. Any further discussion before we vote on that?

COM. COOPER: Did the lower users in Utah agree to this?

COM. CLYDE: The lower users of Utah have been parties to all of our discussions on this matter. The thing they are concerned about is full and complete protection of their rights out of Bear Lake storage. It is our belief that if this irrigation reserve is provided as set forth in my motion at elevation 5915.09, that 40,000 acre-feet of storage upstream can be authorized without impinging upon the irrigation rights below Bear Lake.

MR. MERRILL: But it will raise the devil with the Power Company:

COM. CLYDE: It will cut into the power, we will never deny that. That is the question that has to be resolved, whether the increase from 30,000 to 40,000 justifies the cost. That is the position we came to this morning. Mr. Weidmann proposed 30,000, and he gave us his reasons for doing that. Mr. Hopkins and Mr. Johnson proposed 40,000. Mr. Smoot joined Mr. Weidmann. But I think we were all agreed on this--and I

would like either of those men to correct me if I am wrong in this interpretation--that as I stated a moment ago, it is believed with that irrigation reserve up to the elevation of 5915.09 it will provide full and complete protection to the consumptive users below Bear Lake, and it will cut into the power output, which was indicated in the report submitted yesterday.

MR. BOYLE: Would I be out of order?

THE CHAIRMAN: No, it is up for discussion. It is an original motion of Mr. Clyde.

MR. BOYLE: My name is Ashby D. Boyle. I am attorney for the Utah-Idaho Sugar Company.

I am personally familiar with the basis on which water rights have been sold by the Sugar Company for many, many years. I have been the Company's attorney since January 1920 indirectly, and directly since 1930. We sell by contract to individuals. The gentlemen who have conferred with Mr. Clyde are advisory only. They have absolutely no right in law to bind the individual water users.

So far as the Sugar Company is concerned, it cannot consent since we have sold our water almost in its entirety. We will definitely resist Mr. Clyde's proposal before the Utah Legislature if it is adopted, and we will oppose it to the full extent of our ability.

THE CHAIRMAN: Any further discussion?

COM. COOPER: Thank you.

THE CHAIRMAN: If there is no further discussion, we are back to a vote on Mr. Clyde's motion. I think you all understand it; it has been restated. Now in the reverse again, Wyoming?

COM. BISHOP: I don't think we should vote on it if we can't agree.

THE CHAIRMAN: That is what I tried to bring up once before.

COM. BISHOP: We are not trying to shove anything down anybody's throat.

COM. CLYDE: I don't think until we get unanimous consent we should proceed.

COM. BISHOP: I believe I can say for Wyoming that Wyoming will never go below 40,000 unless they want to amend that so as to recognize all of our existing rights.

MR. MERRILL: We would certainly want to know what the existing rights are. We aren't going to shoot in the dark.

COM. BISHOP: We will guarantee that they won't exceed 10,000 acre-feet.

MR. MERRILL: We might just as well stop right now.

THE CHAIRMAN: I take it, Mr. Clyde--

COM. CLYDE: I have no desire to push the motion. I think it should be unanimous. I think we are here to get all the cards on the table and see if we can reconcile our differences. I think we should keep talking until we do reconcile our differences. We are trying to establish a situation on the

river which will permit its maximum development on the basis of equity and mutual agreement.

THE CHAIRMAN: Do you want to withdraw your motion for the time being?

COM. CLYDE: Yes, I will withdraw my motion with the consent of the second.

THE CHAIRMAN: How do you wish to proceed, you three states?

COM. COOPER: Well, as far as Idaho is concerned-- you want us to make a proposal. As we stated before in the motion, we are perfectly willing to take it up with the Power Company and the Sugar Company, those people who own the storage rights. We haven't any right to give away their water. We contend that they have the storage rights; and we haven't any right to give it away without their consent, or consent to something without their approval--I will put it that way. If we can meet with them at their convenience, we will talk it over with them and see what they say about it. This proposal that we made is contingent upon agreement with those people, you understand that; and we were willing to meet with the officials of those companies and see how they feel about it.

COM. CLYDE: Mr. Chairman, I think at this time it might be desirable to take stock of the accomplishments to date. We have been at this for 10 years now. This is the first time that the position of the Sugar Company has been made known to this Commission to my knowledge. I think we need to

go into a huddle.

I think the position I stated is the position I still want to maintain, namely, that the Compact be so drawn that it will protect existing rights in all the states, whatever those rights are. We will all have to admit, I think, that the exact rights are not yet determined; and possibly the only way to determine them before we write a compact, if we want to go that far, is to go into a court of last resort. But the purpose of trying to get a Compact is to avoid that path.

It seems to me we should go back home possibly and get all of these parties that are interested. This is going to be a case of give-and-take, a case of compromise. We are close enough right now to get our mail. We are only 10,000 acre-feet apart on the upper storage. If you don't know what I mean by "getting the mail", I will tell you a story which I think is apropos here. A teacher in school one time gave a problem to his class and the problem put to the student was this: "If I send you to the post office and you go half the distance and stop, and then you go half the remaining distance and stop, and then you go half the remaining distance and stop, will you ever get to the post office?" And he said, "No, but I'll get close enough to get my mail." (Laughter.)

We are close enough to get our mail, gentlemen, and it seems to me we owe it to ourselves in these three states to see if we can't close the gap and get our mail in this Compact I think all any of us want is to divide these waters up in as

equitable a manner as possible so that each of the respective states can go ahead and complete the utilization and development of these resources. We can't do it now; we have all deferred any development pending the outcome of a compact which was mutually agreeable. And I think we are so close now that we can't afford to stop.

I would suggest, Mr. Chairman, that this Commission meeting adjourn, that we go back home and make another try and see if we can come up at a future meeting and close this gap.

MR. MERRILL: The legislatures convene in January and if we don't get this done before January, we aren't going to have it for two years. I don't think we should go that long; I think we should have it now or not at all.

COM. COOPER: I agree with you, Mr. Clyde, part of the way. I want to call your attention to the fact that early in this negotiation, it was definitely decided that any amount above 23,000 acre-feet upstream storage, new storage upstream, was going to be detrimental to the water users downstream both for power and irrigation purposes. And by coming from the 23,000 to 30,000, by permitting a common use clause to be inserted of one second-foot, 50 acres, we feel that Idaho has gone a long way. We still feel that we haven't been adamant and disagreeable about arranging for this Compact, and we are still willing to confer with the people who we feel own the storage rights to see how far they are willing to go, and we will report back at two o'clock.

COM. CLYDE: I have no objection to that. I would like to make this observation, though, Mr. Cooper: Although I have only been present at two of these meetings and participated, I have reviewed all of these reports, and it is true that there have been several drafts of the Compact drawn. But I would hesitate to concur in what you said about agreements that have been reached on quantities. I don't think any agreements have been reached as of this moment on anything. There have been some tentative proposals, but no agreements have been reached; and I don't think we should go back and say that there have been agreements reached because as far as the record shows there have been no agreements reached, there have been tentative proposals made.

I would concur in Mr. Cooper's suggestion that we recess and reconvene at two o'clock.

THE CHAIRMAN: Is that all right with you, Mr. Bishop?

COM. BISHOP: It will be all right. I would like to suggest that if we adjourn to another meeting at a future time, we come back with the answers to the question of Mr. Merrill about how much this storage is that is under permit and hasn't been constructed. I think we should know where that is and what it is.

MR. MERRILL: You see at 30,000, it would be 44,000 acre-feet we are allowing. We feel that that is certainly the limit and we can't have any additional amounts dragged in.

COM. BISHOP: Why don't we recess until one o'clock?

THE CHAIRMAN: You are the principal ones involved now for this recess. Do you want two o'clock, or one-thirty, or what?

COM. COOPER: Two o'clock or two-thirty is all right with us. We can meet at either one of those. (Confers.) Mr. Merrill suggests we put it at two definitely.

THE CHAIRMAN: All right, we will recess then--if that is all right with Mr. Bishop?

COM. BISHOP: Yes.

THE CHAIRMAN: --until two o'clock.

(11:33 a.m. Recess.)

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(2:51 p.m. Meeting reconvened. All Commissioners present.)

THE CHAIRMAN: We will convene the Compact Commission meeting again. Are there any results to report from the discussions in your caucuses, any one of the three states?

COM. COOPER: You want us to answer first?

THE CHAIRMAN: I will call them alphabetically, yes. Idaho?

COM. COOPER: We were discussing the question of the Bear Lake water elevation and arguing about that proposition previous to the time we adjourned. The table here shows--it is on page 21 of Mr Thomas' report--"Annual allowance for additional storage above Stewart Dam", at 20,000, making a capacity of 788,900, the lake surface elevation should be

5914.5; and at 30,000 annual allowance above Stewart Dam, the capacity should be 820,100, with a surface elevation of 5914.99; and at 40,000, it should be 5915.09. I would like to direct a question to Mr. Thomas: If we settled on a basis of 30,000, if 5914.5 rather than 5914.9 wouldn't be a sufficient amount for the protection of the downstream users; I would like your opinion on that, Mr. Thomas.

MR. THOMAS: Mr. Cooper, I have anticipated that such a question might be brought up in this meeting and I have prepared a statement containing some of the information you ask. It may get at your question a little indirectly, if you would like me to give a statement?

COM. COOPER: I would like a statement from you at this time, Mr. Thomas.

MR. THOMAS: On page 20 of my Report No. 29, the following statement is made--it is in the first paragraph on the page: "A safety factor. .of 5,000 acre-feet"--do you see the sentence beginning with that?

MR. MERRILL: Yes.

MR. THOMAS: "A safety factor. .of 5,000 acre-feet annually for the 6-year period"--that was referring to the period May 21, 1930 to September 30, 1935 in which the maximum net draft occurred on Bear Lake--" is considered sufficient, and when added to the 676,600 acre-feet establishes the reserve at 706,600 acre-feet, as required for present conditons."

In my opinion, the 5,000 acre-foot safety factor,

that is 5,000 acre-feet a year of 30,000 acre-feet for the 6-year period, is entirely sufficient. Actually in my opinion a safety factor of 1,000 acre-feet a year, or about 6,000 acre-feet for the 6-year period, or maybe even less, would be sufficient.

The reason why I believe the smaller safety factor would be sufficient is this: Three reservoirs exist on Bear River below Bear Lake with a combined capacity--that is a normal operating capacity--in excess of 40,000 acre-feet. I believe that because of the regulation available in these reservoirs, there actually would be extremely small quantities of Bear Lake water released for irrigation purposes that actually would not be used for irrigation. In the event of a rainstorm or other unpredictable occurrence which would result in a Bear Lake release actually not being needed for irrigation, I believe the water could be held in one or more of the three reservoirs until needed for irrigation following the rainstorm or other occurrence. According to the river records, this actually has been the case; the water has been regulated in the reservoirs.

THE CHAIRMAN: You might mention those reservoirs.

MR. THOMAS: The three reservoirs: The first one, the highest one on the river, is the Soda Reservoir. The next one is the Oneida Reservoir. The last one is Cutler.

MR. KULP: Is that 40,000 acre-feet just their pondage? Do they have to draw down their head?

MR. THOMAS: It is within their normal operating range. It is pondage but it is regulation. I therefore believe an annual safety factor of 1,000 acre-feet, a total of 6,000 acre-feet for the 6-year period, or even less, is sufficient. That means that I believe a Bear Lake irrigation reserve of about 25,000 acre-feet--that is in round numbers--less than the reserve shown in the table on page 21 of my Report No. 29--that is the one you were referring to Mr. Cooper--and also on the diagrams on pages 33 and 34, actually would provide full assurance to the irrigation interests below Bear Lake that their Bear Lake water supplies would not be decreased.

THE CHAIRMAN: That would be applicable to all four figures that you are assuming there?

MR. THOMAS: That is correct. I will get into that a little later on. There may be a question as to why I did not give this information in Report No. 29. This is the reason:

When the Engineering Committee met at Logan in the spring of 1952 to consider the procedures to use in making the studies presented in the Engineering Committee Report No. 25, Mr. Thorum of the Utah Power and Light Company met with us to give us such data and assistance as he could. At that time he felt that an annual safety factor of 12,000 acre-feet--that would be 72,000 acre-feet for the 6-year period--might be needed. Those figures were actually used in Report No. 25.

Later studies of my own have convinced me that the

12,000 acre-foot figure was much more than sufficient. Possibly Mr. Thorum has come to an opinion similar to mine, as I am sure he has given the matter additional study since the spring of 1952. For my Report No. 29, I did hesitate to show too wide a departure from the 12,000 acre-foot figure without giving Mr. Thorum and the Engineering Committee an opportunity to pass their judgment. Since there was not sufficient time to take up the matter with both Mr. Thorum and the Engineering Committee, I used for Report No. 29 a judgment figure of 5,000 acre-feet for the annual safety factor. As I said before, I do consider an annual safety factor of 1,000 acre-feet, or less, or a Bear Lake irrigation reserve of 25,000 acre-feet less than that given in Report No. 29, to be sufficient.

A further decrease in the reserve in addition to the 25,000 acre-feet could be made, if desired by the Commission, but this might not give a full, 100 percent assurance to the irrigation interests below Bear Lake that their Bear Lake water supplies would not be decreased as a result of the Compact.

If the reserve were reduced by 25,000 acre-feet, the reserve capacities and lake elevations corresponding to the zero--that is for the present conditions--for the 20,000, 30,000, and 40,000 acre-foot allowances for storage above Stewart Dam, would be as follows--if you would like to write these above the typewritten figures on page 21 in the table it might be a good place to keep them:

For zero storage allowance, or present conditions,

the reserve capacity would be 681,600 acre-feet. The corresponding lake elevation, Utah Power and Light datum, would be 5912.91.

For a 20,000 acre-foot storage allowance, the reserve figure would be 763,900 acre-feet. The corresponding lake elevation would be 5914.15.

For a 30,000 acre-foot storage allowance, the reserve figure would be 795,100 acre-feet. The corresponding lake elevation would be 5914.61.

MR. SCALLEY: What was that for 20,000, 5914.15?

MR. THOMAS: .15. For a 40,000 acre-foot storage allowance, the reserve figure would be 802,100 acre-feet. The corresponding lake elevation would be 5914.72.

These figures have been computed rather hurriedly just in the last few minutes and should be checked for errors in arithmetic before any use is made of them; but I believe they are substantially correct. I really suspect the only error that might occur would be in the last place on the elevation; but I would suggest that they be checked before any use is made of them.

COM. COOPER: Thank you, Mr. Thomas. Now we had some discussion relative to the presently existing storage capacity rights above Stewart Dam approximating 14,000. Mr. Bishop and the Wyoming people agreed that they would get those figures exactly. I would like to know what those are now.

COM. BISHOP: We couldn't give them now. We have

got to go home to get them. It will take some time to look up that information.

COM. COOPER: Do you know approximately what they are Mr. Bishop?

COM. BISHOP: I know 5,000 acre-feet I am sure of, and there would be some small reservoirs.

COM. COOPER: 5,000 in addition to the 14,000?

COM. BISHOP: Yes.

MR. PERSON: That is existing rights?

COM. BISHOP: That aren't constructed. The existing reservoirs, constructed, that is a matter that should be checked before we make a decision on it. If there is a constructed reservoir that isn't recognized, it would be pretty bad for us; it could be used against us to keep the Compact from going through the Legislature. I think the Dean is correct when he says we really ought to list those. I think we ought to find out what ones they are and give the capacity and list them, and then there won't be any mistake about it. Don't you think that is a good idea?

MR. SMITH: Didn't you have in mind the ones already constructed when you said that?

MR. PERSON: Yes, then there would be no question in the future what we are talking about, the constructed reservoirs.

MR. SMITH: I think the engineers have that.

MR. JIBSON: We have that as of November 1951.

COM. BISHOP: There have been some constructed since then, including the one of Mr. Myers we have talked about. Mr. Myers has already sent in his notice of depletion and is ready to submit his proof on it now.

COM. COOPER: It is extremely difficult to fill this figure in until we know what they are.

COM. BISHOP: Can't we make that wording so as to cover it? I don't like that wording. Couldn't we just make it include the constructed reservoirs, "not exceeding--." If you want to put a figure on the end, we can give you something that we will be pretty thoroughly sure to cover the situation. Maybe we can do it that way.

MR. IORNS: Mr. Chairman, I would like to call your attention to the particular listing of reservoirs and records that were collected on existing reservoirs in the Basin. That investigation in the Basin for the reservoirs resulted from a recommendation by the Bear River Compact Commission at its meeting in Salt Lake City on August 23, 1951. At that time it was discussed about the detail or accuracy with which this examination should be made; and along with the discussion, this was what was suggested by the Committee, and this is the wording that is in the report that was prepared by Mr. Jibson on it:

"Since time was limited and because accurate field surveys would be both time consuming and costly, the Committee suggested that the field examinations be limited to

making only approximate checks on capacities."

Now if you gentlemen are going to get very technical on whether you are going to say that existing reservoirs are any more than approximating so much, the only thing that I can suggest there is that you stop right now and put an engineering crew in the field and have accurate surveys of these reservoirs and have accurate figures. I think you are quibbling over something that you could call a thousand acre-feet more or a thousand acre-feet less; and I don't think our examination made in the field is anywhere within a range of a thousand acre-feet more or a thousand acre-feet less.

COM. BISHOP: These little reservoirs that have been approved in Wyoming have been pretty well figured and I am well satisfied that the capacities are sufficiently accurate for all practical purposes.

MR. IORNS: If you examine this table prepared from Mr. Jibson's examination of them, we find, for instance, an adjudicated right for a reservoir, Holland on Leeds Creek, the adjudication is 65.32 acre-feet. As near as Mr. Jibson was able to check that with a limited survey in the field, there is 29.6 acre-feet.

COM. BISHOP: That is an old one, isn't it?

MR. IORNS: It is just an example.

MR. MERRILL: 29.6 acre-feet.

MR. IORNS: 29.6.

MR. MERRILL: And the adjudicated was 65 acre-feet?

MR. IORNS: The adjudicated was 65.32 acre-feet as compared to Mr. Jibson's determination of 29.6 which is a rough measurement of it in the field. That is not an accurate instrument survey and I wanted to call your attention to that. There are other discrepancies. Let me pick out another one here that is considerably greater. Here is one that is in the opposite direction. This is the North Reservoir on Woodruff Creek. They have an adjudication according to the adjudication records of 55 acre-feet. We find there is 145 acre-feet of space in the reservoir.

So the only thing I could say, that if you are going to be really technical about the accuracy of these figures, why I don't think we can use this rough examination which we were directed to make by the Committee, which is on the basis of very limited information and a very limited amount of field work, that we can tie it down very close.

COM. CLYDE: Mr. Chairman, I am a little confused over this swing on this storage that is already built. I thought that was a matter that had been reconciled, that we would recognize the existing storage; and the only question at issue was the storage that was to be built from this date on. Is that the thing or--

THE CHAIRMAN: I think it ties back to recognizing it as of a certain date. Back a couple of years ago or whenever it was, they started from a certain date as I recall.

MR. PERSON: Of course it seems to me we are writing

a compact, not two years ago, but today. What we should recognize, there is no question about it, is the reservoirs that are now constructed. Those should be recognized first.

COM. COOPER: That is our point.

COM. BISHOP: It is rather unimportant as to the exact acre-feet if we are going to recognize them. What is the difference?

COM. COOPER: But your blank is left here, and we don't want to be misunderstood, that we are quibbling about something--we don't want that understood. Neither do we question the integrity of anybody in connection with this thing. But we don't want to set this figure at 14,000 and then find out there is 25,000 later--

MR. PERSON: Yes.

COM. COOPER: --or even 20,000. There is the point. That makes a considerable amount of difference as to the total overall.

MR. PERSON: Now I say that the 14,000 is probably within 5 to 10 percent.

MR. JIBSON: I would like to add just something further to Mr. Iorns' statement on this. The larger more important reservoirs were more accurately determined, not by a new survey in the field but by existing filings, and in some cases by running new levels to the present spillway from the old bench marks. I think we have considerable accuracy on such reservoirs as Neponset, Crompton, and several of the

larger reservoirs which are in existence. The new reservoir on Birch Creek, we took their filings on it and it should be just as accurate a survey as you would ever want.

But several of the smaller reservoirs had water in when we checked them and our only method of checking elevations was to float up and down in a rubber boat and check a few spots. So I wouldn't want to say ^{for} each reservoir listed here, the capacity that we found in the field is the accurate capacity for that reservoir; but in the aggregate, as stated in Report No. 22, the results should be fairly accurate because the large reservoirs have been accurately determined.

COM. COOPER: And you get that figure then at 14,000?

MR. JIBSON: That is what it totals. Mr. Iorns said that might vary a thousand. That is possible.

COM. CLYDE: It totals 14,500.

MR. JIBSON: Most of the reservoirs in which large discrepancies were found were smaller reservoirs.

MR. PERSON: What we are trying to get at is to recognize existing constructed reservoirs; and 50 years from now, the only way they will know what we are talking about is to name them in the Compact. We don't have to put the capacity, but name them. Otherwise, 50 years from now, if five or six of those washed out and we built new larger ones, we would say, "Those were the ones we thought we were recognizing."

MR. SMITH: You would say, "capacity as presently constructed."

MR. JIBSON: We can give you the name, the source of the water supply, and the location down to the Section on all of them.

MR. PERSON: I think it ought to be written in the Compact. I wouldn't object if you want to do what Dr. Bishop wants you to do, include what we have on file.

COM. CLYDE: If you take it off the top it has to go in the bottom.

COM. BISHOP: I might add to what Mr. Iorns stated about the impracticability of making surveys. In 1945 we got a decree on the North Platte River and we started crews working. We have been since 1945 determining the irrigated area in the North Platte River Basin and resurveying the reservoirs. We were limited to 18,000 acre-feet storage in any one year. In order to know where we were at, we had to resurvey those reservoirs and establish bench marks because a lot of the old surveys were very inaccurate. We have been about two and a half years now with a pretty competent engineer working a good deal of the time on that. There are 97 reservoirs and he has 95 of them now. But it is no little job for an engineer to get out and survey a lot of reservoirs and do an accurate survey and put in bench marks and do the survey we need for administration. I don't think we need that for this Compact.

MR. JIBSON: I had to cover 35 or 40 and I did it in two weeks with an assistant, so you can tell from that about the extent of how accurately we surveyed them. I did use a

plane table and levelling instrument, and we ran contour surveys on them. The smaller ones are probably accurate enough for all practical purposes.

MR. IORNS: Not for figures to be in a document.

MR. JIBSON: Not for figures to be in the Compact, certainly not. But we could name them and we could tie it down to the Section.

MR. SMITH: I believe what we are concerned about is the total figure which would safely cover the capacity of the presently constructed reservoirs, isn't that right?

MR. PERSON: That is right.

COM. COOPER: That is what I want.

MR. JIBSON: This word "approximating" was put into the Compact just for that purpose, so many acre-feet.

MR. SMITH: 14,500, you feel that would be within a range of what we might call approximate?

MR. JIBSON: I would say 14,000. This is as of September and the report is dated November. We did the work in September 1951. Since that time, we know from Mr. Myers' statement this morning that his reservoir was completed. There may be other new ones.

MR. SMITH: That is the reason I would say 14,500.

MR. JIBSON: I wouldn't say that would cover it at the present time. It covered it at the time of the report.

COM. BISHOP: Mr. Myers, do you know whether others have been completed besides yours?

MR. MYERS: I don't know of any.

(General discussion.)

COM. COOPER: In Article II, 6, it says: "Additional storage' means storage in reservoirs constructed subsequent to"--a certain date, and that is left blank. Now then, if we could fix the date that this amount approximated 14,000 acre-feet, and then set the date in here--

MR. JIBSON: If you did that you would want to set the date at about September 1, 1951.

COM. COOPER: Would that be agreeable?

MR. PERSON: No. That is, we don't think it would be satisfactory to anybody. When we go to the Legislature we want to ask as of this date, that is with the quantity in there. Otherwise we will have somebody say, "Here, I have got a reservoir up here and you aren't recognizing it." "As of the date of the Compact" is what should be in there and change the other figures to cover it.

COM. CLYDE: Are there any reservoirs under construction now?

MR. PERSON: I don't think so.

COM. CLYDE: Mr. Chairman, then I move that we put the figure in there, the 14,594, together with the list of reservoirs submitted in the report prepared by the Geological Survey dated November 28, 1951; and that the date under Article II on page 2 be January 1st, 1952. That includes Mr. Myers' reservoir. I think it includes everything that has been com-

pleted, the date of January 1st, 1952.

COM. BISHOP: Mr. Myers' wasn't completed until this year.

COM. CLYDE: It was in this list.

MR. JIBSON: But the Myers Reservoir at the time I inspected it wasn't completed. It was only partially completed and was just completed this past year. So the additional 400 acre-feet was not present at that time.

COM. CLYDE: But the report here shows Myers' Reservoir on Mill Creek, Section 13, Township 13 N, Range 120 W, total storage capacity, 556.5, with a notation that 140 acre-feet is the present capacity and the additional capacity is under construction.

MR. JIBSON: The 140 was added in the five hundred something.

MR. IORNS: The adjudication from the State was for 516.

(General discussion.)

MR. PERSON: We do have this problem in naming the reservoirs, of enlarging existing reservoirs. We would have no way of knowing when we don't have our capacities listed and we just have the name and the section and the source of it. If the reservoir were later enlarged, of course it would have to be checked upon and listed as new storage. That problem might arise if we list the reservoirs in the Compact.

COM. CLYDE: I didn't get a second to my motion, did

I?

THE CHAIRMAN: I am coming back to that.

COM. CLYDE: Let me make another. I move we put 14,500 in there and put the date as January 1st, 1955.

COM. BISHOP: Make it 15,000 and I will second your motion.

MR. MERRILL: Why keep boosting it up?

COM. CLYDE: It just takes it off the other end.

COM. BISHOP: It isn't adding anything if we have a statement of the ones covered.

MR. PERSON: We are saying "approximately", Clark. What we are trying to do and what we are doing is recognizing existing reservoirs with approximately so much.

COM. BISHOP: If you are going to say approximately, let's make the figure big enough to cover it.

THE CHAIRMAN: Are you making the motion now, Mr. Clyde?

COM. CLYDE: Yes, I made a motion and I didn't get a second.

COM. BISHOP: I would like to have you change your motion.

COM. COOPER: I will second that motion, 14,500.

MR. SMITH: I wonder if you would restate it so we will have it clear.

COM. CLYDE: The motion I made was, we insert the figure 14,500 in the appropriate place under Article V, Section

B; and we insert the date, January 1, 1955, on page 2, under Article II. Is that a reasonable situation; make the date as of January 1st, 1955, everything built before that time?

COM. BISHOP: That would be all right, I guess.

MR. JIBSON: We don't know of anything else that is built in the past three years.

THE CHAIRMAN: You have heard the motion and it has been seconded. Is there any discussion? (No response. Thereupon a vote was taken and Com. Clyde's motion carried unanimously.)

COM. COOPER: Mr. Chairman, I still have the floor, do I?

THE CHAIRMAN: Yes.

COM. COOPER: I want to ask Mr. Person a question: Some time since, we had a discussion relative to this storage above Stewart Dam, and Idaho made a proposal to recognize storage rights above Bear Lake to the amount of 29,500 acre-feet; and its proposal was countered by a proposal from the upstream users for 36,000. I just want to ask this question: If we decided to split the difference with a provision that Thomas Fork be taken care of for 1,000 acre-feet of storage, and we set the figure at 33,000 acre-feet upstream storage--if that wouldn't be attractive to you people?

MR. PERSON: There are so many "ifs" and "ands" in that I am going to have a little trouble. You asked me if it would be attractive?

COM. COOPER: I asked you if it wouldn't be attractive to your group.

MR. PERSON: If you offered us 33,000 acre-feet of upstream storage?

COM. COOPER: That is right, with that one condition, that the Thomas Fork people be taken care of out of that. We are splitting the difference with you and we are giving you 500 acre-feet in addition to what we did in the beginning.

MR. PERSON: What are the Thomas Fork people going to ask for?

COM. COOPER: A thousand acre-feet.

MR. PERSON: You are proposing 32,000 acre-feet. If that proposal came from anybody but you, I would say it was the most unconscionable proposal that was made; but since it is coming from you, it must have some merit.

COM. COOPER: I am going to take you to dinner tonight, just as sure as the world.

COM. BISHOP. Fred, I am in favor of Idaho having the thousand acre-feet all right on Thomas Fork; but I don't want it to be deducted from Wyoming's allocation or from the joint allocation to Utah and Wyoming.

COM. COOPER: You remember we agreed before to the 29,500.

COM. BISHOP: We didn't agree to anything.

COM. COOPER: You set it at 36,000.

COM. BISHOP: We said we would agree to 36,000 and

you wouldn't accept it.

COM. COOPER: And we are willing now to split the difference with you. You are getting 500, and you give 500 to the Thomas Fork.

COM. CLYDE: Mr. Chairman, I wasn't on the scene at that time--

THE CHAIRMAN: Let's see if Mr. Cooper is through yet. Are you through for a minute?

COM. COOPER: That is all I have to say.

COM. CLYDE: I wasn't on the scene at that time, but I have no record of Utah ever agreeing to 36,000.

COM. BISHOP: We didn't agree. We said we would agree and I wouldn't agree to the 29,000. But as I understood it, it was all off if we didn't accept or you didn't accept; we start over again. I believe you made it pretty plain yours was withdrawn if we didn't accept then. It was kind of an ultimatum.

COM. COOPER: I think you made it equally plain when you said 36,000. I don't think there was any quarter given in either instance, Clark.

COM. BISHOP: We have got additional information since then that points out that we were awfully foolish when we offered.

COM. COOPER: We have information to the effect that we were silly too. We went back to the 23,000.

THE CHAIRMAN: I believe Mr. Clyde still has the floor.

COM. CLYDE: I asked my question. We couldn't subscribe

to 36,000, especially if a thousand acre-feet comes out for Thomas Fork, which would cut it down to 35,000. At least I am not authorized at this moment to do that. I might argue that point with my constituents, but I am not authorized at this moment to come to that point.

THE CHAIRMAN: Is there further discussion by the members?

COM. CLYDE: Mr. Chairman, apparently we are at an impasse at the moment. I still think there is a possibility of reconciling these differences. We have only had one day to study these reports; and it is a pretty big order to expect us to assimilate all of it at one sitting. How would it be if we adjourned this meeting and had another meeting, say, the forepart of January? It would still be time to get this thing before our legislatures if we can come to an agreement.

THE CHAIRMAN: It still has to be sent out, I imagine, to advisory groups outside. You are handicapped for that.

COM. COOPER: Some of these legislators are apt to be tied up in meetings in the legislature.

MR. MERRILL: And wouldn't be able to be there.

MR. BLACK: The bills have to be introduced in about the first three weeks of the legislature, if it is like it is in Wyoming.

THE CHAIRMAN: I might suggest to the Commission that you probably have some work for the Legal Committee rewriting some of these articles after you come to an agreement before it

can be submitted.

COM. CLYDE: The language of this thing has all got to be rewritten after we get the principal points.

THE CHAIRMAN: After you agree on those, your Legal Committee would have to really work then.

COM. CLYDE: Would it be possible to meet again in ten days?

COM. BISHOP: Mr. Chairman, we have got to have this thing in shape so it can be typed up and signed. We don't want to get up against a proposition like we did on the Yellowstone. We waited for a couple of weeks for the Legal Committee to revise it and everybody said they would sign it; and then when it was sent out for signature, somebody backed out. I don't want to be a party to a compact that they don't sign right there and then when they say "Yes." I believe we want to do it that way, and don't give anybody a chance to go back on it after they agree to it. Let's get the signatures.

COM. COOPER: I agree to that.

COM. BISHOP: It isn't too hard to do it. We have girls that can typewrite.

MR. PERSON: Fortunately I don't have to sign it. The thing that worries me is Fred will talk me into something. I would like to go home and think about it before I signed it.

COM. COOPER: I think we could spend a few minutes in caucus with our own group. Maybe my fellows will slap my ears down for saying this, I don't know.

THE CHAIRMAN: You are certainly both sides not very far apart as far as measuring water on this river. Do you want to caucus for a few minutes?

COM. COOPER: I move we recess for 15 minutes.

COM. CLYDE: Second the motion.

(Thereupon a vote was taken and Com. Cooper's motion carried unanimously.)

(3:37 p.m. Recess.)

(4:09 p.m. Meeting reconvened.)

THE CHAIRMAN: I called you back to see if you had any more ideas that you might get together. Does anybody have any motions or suggestions?

COM. CLYDE: Mr. Chairman, I have been in caucus with the Utah delegation and we cannot come to an agreement as to what we need to do or what we should do right now. I move that we adjourn this meeting and reconvene again sometime early in January for further consideration.

COM. COOPER: We can't do that.

THE CHAIRMAN: Any second to the motion? (No response.)
I hear no second.

MR. MERRILL: Mr. Cooper is in the Legislature and Mr. Smith will be very badly tied up with legislative work.

COM. CLYDE: What time could you meet?

MR. SMITH: How about tonight? Could you do anything tonight?

COM. CLYDE: I doubt that we can do any more tonight

than we can do right now.

MR. PERSON: Why don't we meet on the 9th?

(General discussion.)

COM. COOPER: I would like Mr. Person to answer my question before we adjourn.

MR. PERSON: Sir?

COM. COOPER: You didn't answer my question.

MR. PERSON: I tried to answer it best I could. I said it must have merit because you proposed it, but I haven't been able to convince Dr. Bishop it has merit.

COM. COOPER: Are you standing in the way of this thing?

COM. BISHOP: I don't know what you are talking about.

MR. SMITH: Does Utah have any proposal to make?

COM. CLYDE: We have no proposal. We are standing on 40,000 as of this moment.

COM. BISHOP: I think we made the only proposal we can make. This 40,000 business is about as low as we figure we can go.

(General discussion.)

COM. CLYDE: Mr. Chairman, I am going to make --it isn't a proposal and I don't want to make it as a motion--but is there any middle ground on a total of 50,000 acre-feet storage upstream, that we can get upstream?

COM. COOPER: Explain yourself.

COM. CLYDE: 50,000 acre-feet.

COM. COOPER: You mean 50,000 over-all?

MR. SKEEN: That is including existing.

COM. COOPER: That would be 35,500 in addition to this existing storage?

COM. CLYDE: I say that is not a motion. If there is any chance to get together on something of that kind I am willing to fight for it; but if there is no chance, I am standing on 40,000.

MR. SMITH: How does the Wyoming delegation feel about that?

MR. PERSON: Did you hear that, Clark?

COM. BISHOP: I am not sure whether I heard it or not. I don't see the philosophy of 50,000.

COM. CLYDE: My point was this on 50,000: We have discussed 30,000 and we have discussed 40,000; and we have this 14,000 or 14,500, whichever figure we got in there. I asked the question: Is there a possibility of these various groups getting together on a total upstream storage of 50,000, which in effect means 36,000 of new storage if the other is 14,000; or 35,500 if it is 14,500.

COM. BISHOP: I see.

COM. CLYDE: Mind you, somebody raised the question there is no common ground we can get together on. I am throwing that out to see if there is any possibility of further discussion resulting in some good in reaching a conclusion. I say I am not authorized by my group to make that proposal, but

I would be willing to fight for it and see if I could convince them, if there is some possibility of reaching a conclusion. If there isn't, then I stand on 40,000.

COM. COOPER: You want me to answer that?

THE CHAIRMAN: Yes, either one of you. He has made a statement.

COM. COOPER: We feel that that's too high. However, to say that anything is impossible is an insult to the intelligence of fine people like we are. And if you want to meet tonight, we will meet with our people and see if they are willing to go that.

THE CHAIRMAN: Mr. Bishop, have you got a statement?

COM. BISHOP: I will go just as far as Fred will. I will meet with my people and see if they are willing to go that.

MR. SMITH: Do we have to wait that long? Is it possible that you could meet with them right away so the men who have reservations can still make them?

THE CHAIRMAN: Will you make your statement again so they can hear it?

COM. BISHOP: I said I would be willing to go along with Mr. Cooper and take the matter up with my people and see how far they will go on that.

THE CHAIRMAN: When can we do that?

MR. PERSON: I don't think you can possibly do it tonight or tomorrow morning.

COM. BISHOP: Several of our people have gone home.

COM. CLYDE: Some of ours have too and I wouldn't want to pass on it finally until I confer with them.

COM. COOPER: Mr. Chairman, I move we recess for 15 minutes.

COM. BISHOP: We have got to get a train at 5:30 and we have to check out. We can't very well stay any longer.

THE CHAIRMAN: We can get a car to take you down.
(General discussion.)

COM. COOPER: I will say that there is a possibility. That is the way you put it, isn't it?

COM. CLYDE: Yes, that is right.

COM. COOPER: There is a possibility that we can agree on that compromise figure, but that will be our limit.

COM. CLYDE: Does that mean, Mr. Cooper, that we could adjourn this and then come back in a week or so, after we have had a chance to talk to our people, and see if we can close this up?

MR. SMITH: I am green at this, this is my first meeting. I know very little about it so perhaps I am presumptuous. But from what I have gathered from all three delegations and the persons I have talked to, every time you have a meeting and go away, each side comes back and wants something else.

Now if you are this close, why doesn't each person who has to contact somebody else get on the phone and call him or go see him, and then take the reins in his hands and take enough authority upon himself to sign this thing if we can agree. If we can't, of course we can't. But you know, each

one of you, pretty much what you can do and how far your people will go with you. I have been thinking as we have been sitting here today and yesterday, because it is new to me, how much I myself have criticized the United Nations, which I am strongly for, and all the rest of the people who have; and here we sit around and fool around on a few thousand feet and say we can't do anything about it because we don't have authority for it--and then we criticize them on international matters!

Isn't it possible for us to expedite this thing and get it done tonight, even if we miss our train and our plane. I have got a plane too that I am supposed to make. I hope I haven't offended anybody by saying this, but it is important to all of these people. Let's see if we can get it done.

COM. BISHOP: You understand that we have a situation I believe in most states where we have got to have meetings with our people before we put it before the Legislature and try to sell it to them.

MR. SMITH: It is that way in all states. And if we agree on something we can't sell to the legislatures, we just have to start over again. But if we don't agree, we can't even try to present it to the legislatures. What do you think, Mr. Person?

MR. PERSON: Frankly, I would like to get it settled tonight or tomorrow, but I am confident we can't. Our orders are pretty definite on 40,000. We will have to meet with some people in Wyoming and we couldn't convince them over the

telephone--members of the Legislature.

(General discussion.)

COM. COOPER: If you want to settle, gentlemen, on the 50,000 over-all, we will settle with you.

MR. WEIDMANN: That is a good deal, gentlemen, you better take it.

MR. SMITH: I move we recess for five minutes to consider that.

MR. MERRILL: You understand that offer also is subject to that thousand acre-feet of the Thomas Fork people.

COM. BISHOP: No.

(General discussion.)

COM. CLYDE: Mr. Chairman, I move you that it be the sense of this meeting that we adjourn this meeting with this understanding, that a tentative agreement be reached on 50,000 acre-feet of total storage upstream, subject of course to our going back to our people and getting their approval for this development.

COM. BISHOP: I will second the motion.

COM. COOPER: Now then, our people insist that the Thomas Fork allowance be taken out of this 50,000 acre-feet. Of course this agreement is tentative, we admit that.

THE CHAIRMAN: You haven't it clear in your motion, Mr. Clyde. Is that in or out?

COM. CLYDE: That is out. The Thomas Fork storage is not involved in my motion. I think the Thomas Fork storage is

not part of this upstream problem. I don't think it should be considered as a part of it, and that is the reason I left it out.

MR. SMITH: The motion is simply that we shoot for that figure and we have to get ratification at home.

COM. CLYDE: That is right. It isn't binding on anybody but it is something we can shoot at. Maybe you gentlemen can come back with a good argument and convince us, but at least I would like to go away with an objective.

MR. SMITH: May I ask Mr. Iorns one question: What effect do you think it would have on the river system, this thousand acre-feet we have been talking about?

MR. IORNS: A thousand acre-feet, if it is in addition to the 50,000, or less--I would hate to have to measure it. I don't know--

MR. SMITH: But would it make any appreciable difference in supplying the people we are talking about?

MR. IORNS: Meeting the needs of the people on Thomas Fork?

MR. SMITH: Yes.

MR. IORNS: I don't know what the Thomas Fork people's present plans are on the capacity of their proposed reservoir up there.

MR. SMITH: I will withdraw.

MR. MERRILL: Mr. Kulp told us before he left, several times, that this had to be considered in this Compact; and

when Mr. Cooper made his proposal, it was with the understanding of the Idaho delegation that that was part of it--that was all of the water that was to be allocated for upstream storage and that it took care of this first of all.

MR. IORNS: I might call this to your attention, and that is, the entire negotiations and considerations and studies have been based upon the needs for the Utah and Wyoming lands. There has been nothing in this study so far injected for adding to those needs of the Wyoming and Utah lands, the needs of the Idaho lands.

MR. MERRILL: Then we ought to reduce that figure.

MR. IORNS: I rather think it is something over and above what the Commissioners for Utah and Wyoming have been considering in their needs for upstream storage. I would be rather of the opinion it should be in addition to what the two states would agree to up there.

THE CHAIRMAN: You made the motion. I think it is understood that the motion you made was for 50,000?

COM. CLYDE: Yes, sir, without the Thomas Fork.

MR. SMITH: It is just trying to get approval; we aren't agreeing.

COM. COOPER: You understand we are not agreeing today now.

COM. BISHOP: I am in favor of Thomas Fork having all the storage they can get, but not from our allowance.

MR. SMITH: I wonder if you would restate the motion

again.

COM. CLYDE: I move it be the sense of this meeting that we tentatively accept a total of 50,000 acre-feet of upstream storage for Wyoming and Utah, and not to be considered as an accepted fact on the part of any state, but to be something to shoot at; and that we call another meeting as quickly as possible to hear the results of our attempts to reach an agreement.

COM. BISHOP: I second it.

THE CHAIRMAN: Any further discussion on the motion?

MR. SMITH: Question.

THE CHAIRMAN: Wyoming?

COM. BISHOP: Aye.

THE CHAIRMAN: Utah?

COM. CLYDE: Yes.

THE CHAIRMAN: Idaho?

COM. COOPER: We will go along with you with that reservation, that we will expect to justify this thousand acre-feet of storage on the Thomas Fork.

MR. MERRILL: That will have to be part of it.

COM. COOPER: That will have to be part of it.

MR. MERRILL: Of the 50,000.

COM. CLYDE: I suppose the impact of that then would be that if that has to become a part of it, then we would have to consider a change in the total quantity allowed upstream?

MR. MERRILL: No, sir.

MR. PERSON: In other words, we should go home and argue with our people on 49,000 total storage rather than 50,000.

COM. CLYDE: That is what it means.

MR. PERSON: If that is what you mean, Fred, we can't do it. Our people won't agree; they don't like those figures, 49,000.

COM. COOPER: They would consider it if it was 59,000, wouldn't they?

COM. BISHOP: Mr. Chairman, I move we adjourn.

COM. CLYDE: The motion is in effect lost, we have nothing to look forward to, if we agree on unanimous consent to any motion.

THE CHAIRMAN: I thought you made a motion and everybody voted "Aye."

COM. CLYDE: No, Fred didn't vote "Aye."

THE CHAIRMAN: He qualified it.

COM. COOPER: I voted "Aye" with that reservation, that we would justify the proposal of the Thomas Fork reservoir.

COM. BISHOP: You don't realize what a proposition we have to try to put it over on 50,000 for the two states, really you don't.

MR. PERSON: You are also going to try to sell 50,000 to your people at the same time as we try to sell 50,000 to our people?

COM. COOPER: Surely.

(General discussion.)

MR. PERSON: If you aren't going to try to go home and sell your people on 50,000, then there is no sense in selling our people; and we know if you say you will try, you will try, and we will try.

COM. COOPER: Wasn't that the import of my statement? Isn't that what I meant, isn't that what I said? Sure I did.

COM. CLYDE: If that is what you meant, I am satisfied. I didn't think you meant that.

COM. COOPER: I said I would want to make that reservation, we would justify taking that out of the Wyoming allocation.

MR. SMITH: I think Fred means he will be able to show you we should have that one thousand out of the fifty.

MR. PERSON: If he can't show it, he will try for the other?

MR. SMITH: He will try for the other.

COM. CLYDE: When can we meet?

(General discussion.)

THE CHAIRMAN: We will set December 14th, then, at 9:30.

COM. CLYDE: I will second Clark's motion to adjourn.

(Thereupon a vote was taken and Com. Bishop's motion carried unanimously.)

(4:44 p.m., Friday, December 3, 1954, Meeting adjourned.)