5-8-1981

Trial Transcript, Vol. 55

Frontier Reporting Service

File 162
4413
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case # 4993

File # 162

4413

IN THE DISTRICT COURT FOR THE FIFTH JUDICIAL DISTRICT

WASHAKIE COUNTY, STATE OF WYOMING

IN RE:	)
	)
THE GENERAL ADJUDICATION OF RIGHTS TO USE WATER IN THE BIG HORN RIVER SYSTEM AND ALL OTHER SOURCES, STATE OF WYOMING.	) Civil No. 4993

FILED

5/20 1981

Margaret V. Hampton CLERK

DEPUTY

VOLUME 55

Friday, May 8, 1981

ORIGINAL

APPEARANCES

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THE SPECIAL MASTER: May we come to order, please. Mr. Echohawk.

MR. KROB: Your Honor, before we begin the witness today, I believe you have before you a motion to expedite discovery. I just wish to to inform the Court that we've been given assurances by the attorneys of the United States that the materials requested therein, some of which are apparently not now available but are being produced, will be made available to the State as they are produced. And we -- therefore, we withdraw our Motion For Expedited Discovery. And we request some indication by Counsel of the United States as to when we might be -- when we might expect to begin receiving those materials.

THE SPECIAL MASTER: Mr. Echohawk or Mr. Clear.

MR. ECHOHAWK: I was informed yesterday, it appears that a portion of that information requested by Wyoming's -- in Wyoming's request, has been requested previously from another witness, and that's information being generated, and I was told yesterday it should be available by -- around May 11th.

THE SPECIAL MASTER: Very fine.

MR. ECHOHAWK: And the rest of the information we'll start cranking that out as soon as it's available.

THE SPECIAL MASTER: I congratulate both of you in working this out, and I appreciate it.

You may proceed, Mr. Echohawk.

THE WITNESS: Excuse me, my microphone is not on.

(Off-the-record discussion.

DIRECT EXAMINATION (CONTINUED)

BY MR. ECHOHAWK:

Q Mr. Dornbusch, yesterday, just so we can kind of recap where we were, would you just briefly run through where we left off yesterday.

A Okay. Just very briefly, we were talking about crops and crop yields and the fact that once we determined the crop yields and multiplied them by the crop prices, we obtained the gross returns for the highland and the lowland areas as I described yesterday.

The next step -- Do you want to move to the next step then in that?

Q Mr. Dornbusch, I direct your attention to what has been marked as United States Exhibit WRIR C-270. Would you please identify that.

A Yes. That exhibit shows the next step in the process. Once we've obtained the gross returns for both the highland and the lowland acres, the next step is to subtract out the production costs for each of those crops to determine the net returns for the highland and lowland areas.

Q Information for the production costs, determination of the production costs, is that type of information reflected in the United States Exhibit WRIR C-268, which is your report?

A Yes. Immediately following Table 2 there are a series of tables for each of the crops in the crop mix and those tables show what you might call the crop budgets or the production development.

THE SPECIAL MASTER: What does the 4 percent refer to just after the words "Table 2" on Page 5 mean?

THE WITNESS: Okay. That refers to the discount rate used in this analysis.

THE SPECIAL MASTER: To what is the 4 percent discount rate applied?

THE WITNESS: It's applied to moving the values of returns and costs to a -- to the same point in time so they might be compared. Remember, yesterday I was talking about the time value of money.

THE SPECIAL MASTER: Yes.

THE WITNESS: And that's the discount rate that's used to move those costs through time so they can be compared.

THE SPECIAL MASTER: Very well.

Q (By Mr.Echohawk) Mr. Dornbusch, now that we have the annual gross net returns for highland and lowland areas, you've mentioned we have to determine the production cost. How did you go about determining production costs?

A Okay. I developed a series of tables which consists of the items that comprise the production, the cost of producing those crops. The tables are in the same format as generally used by Agricultural Extension Service, and specifically here in Wyoming it is precisely the same format that they use.

Q These are how you determined your crop budgets; is that right?

A Yes.

Q Upon what sort of information are your crop budgets based? Did you ever use any special sources?

A Yes. To begin with I referred to the report produced by Doug Agee who is the farm management specialist that I mentioned yesterday. His study was specifically for the Midvale Irrigation District, and he put together the, the report which, as I said, is based upon his study of that Midvale Irrigation District, and I derived much of my information from his report.

Q Did you make any attempt to verify the cost from the -- from Mr. Agee's work?

A Yes. I verified both his cost and the operations and the equipment that he uses. For example, on that series of tables that show the crop budgets, in the first column there are a series of operations that are derived from the Agee record, and I verified those with farmers in the region.

* * * * *

Q (By Mr. Echohawk) Did you make any adjustments from Mr. Agee's work or did you take them all at face value?

A Yes, I made a number of adjustments. Perhaps the easier thing to do would be to deal with those as we go through or just deal with them in general.

Q Why don't you just kind of hit generally on what type of adjustments, and we will discuss them more in detail.

A Okay. Because I -- well, first of all, in the discussion with Doug Agee we found that he had found some errors, I believe there was one error in particular; that although he had identified the amount of fertilizer that should be applied in running his calculations, he ran a calculation for a lesser amount of fertilizer, and he pointed that out to us, and we checked and certainly his cost was lower and we made the adjustment to correct for that.

We also increased the amount of fertilizer used in the malt barley budgets to reflect the increased yields we were projecting for

that crop. We also made some adjustments, for example, we recognized that there were going to be somewhat greater hauling distances for seed and harvested crop in our new project lands as compared to the haul distances that Agee had in the Riverton Project, and we made adjustments there.

Q Okay. Mr. Dornbusch, in using Table 2-A as somewhat of a point of reference, could you take us through what goes into your crop budgets, what factors are considered and how you determined the appropriate costs?

MR. MERRILL: Your Honor, for purposes of a complete record, I'll renew my continuing objection with reference to the exhibit which is not in evidence.

THE SPECIAL MASTER: All right.

THE WTINESS: Yes. To begin with, you can see on the left side of the table we specify the operations that comprise the various principal activity, such as growing and the harvesting. Actually, if I may, I think a more complete table might be 2-B because it shows more of the operations. But actually either one

can work. You can see on 2-B there are operations of the preplanting, the operations that occur before the actual planting; the planting; growing; harvesting and post-harvesting operations. Then within each of those main categories there are specific operations. We can deal with 2-A, it really doesn't matter.

Q Whichever you prefer.

A Sure. I'm just going to deal with it in general now anyway. Then within those categories we have the specific operations, and those I said I derived directly from Doug Agee's budget and I confirmed those through interviews with farmers in the region. Immediately after the operations, you see an identification of the truck or tractor and the implements that's used in each of those operations, and, for example, the first operation you see has -- indicates the size of the tractor, and then after the nature of the operation, and so on down through the column.

The next column shows the material, if any material is applied, such as fertilizer,

the use of twine in baling operations. Immediately following that column shows the tractor hours or truck miles, if it's a truck in that case, that would be necessary per acre for the operation that -- the particular operation we are dealing with.

Q All right. Where were the operations and the particular implements and materials derived from?

A They were derived directly from Doug Agee's report, and also confirmed by the farmer interviews that I conducted. I only made some adjustments, as I said, in the materials to increase the fertilizer for the increased yields, that sort of thing.

Q All right. What would be the next item that you considered?

A Okay, the tractor hours or the truck miles I took directly from Agee with the exception of the truck miles, as I said, and I normalized those prices. You recall yesterday that I mentioned that we were seeking to not only put our cost and returns at the same point in time to compare them, but recognizing the

fact that prices and costs do fluctuate. To remove those fluctuations and obtain a more representative price for a point in time, we followed the WRC guidelines, what they call normalization, to get those averages for the most representative price. Now, Doug Agee's prices were of 1977, and we adjusted his prices to 1979, normalized prices according to factors that are published by the WRC for those particular costs.

Q All right. So you normalized the truck and tractor costs; is that right?

A Yes.

Q Fixed cost?

A Well, I guess -- I'm sorry, I got ahead of my story. I used the tractor hours, the truck miles directly from Agee. I haven't yet gotten to cost, I was a little ahead of myself there.

Q All right. In determining -- how did you determine your truck and tractor costs, your fixed costs?

A The fixed cost, all right. In reviewing the Agee report we discovered, and in discussing the matter with Agee, we realized that he used

a 320 acre farm as his base for determining the costs. In his report he admits that a larger farm would operate more efficiently, and in discussing the matter with him he agreed, as well. and because our farms are going to be so much larger, I felt that we could obtain much better efficiencies, and therefore, made a search of the literature,and studies that might be available to show me what you might expect if you had a larger farm and if you were able to operate your equipment more efficiently. There is a report that has been prepared by the Bureau of Reclamation in the Hardened Bench in Montana, which does exactly that, it analyzes the same equipment that we are using here to see the hours or miles that that equipment is used in its most efficient form.

We based our analysis of fixed costs on the estimates of the most efficient use of that equipment, and the rationale being that our farms are so large and the potential is there for using the equipment so efficiently I felt in some cooperative arrangement, whether

it's owned by the Tribe or a co-op is set up, that a pool arrangement of the equipment would be entirely feasible and practical and could be used to farm those fields, and that's the basis for using the most efficient hours and miles determined by the Bureau of Reclamation.

Q Okay. You mentioned earlier you got a bit ahead of yourself as far as normalization. Is this where normalized prices come in, or do they come in later?

A Yes. In the process of computing the fixed costs, we determined an hourly fixed cost which is based upon the initial price of the equipment and a complete analysis of the fact that you have to purchase the equipment at the beginning of the project, each piece of equipment will have a unique life and a salvage value, then you must repurchase the equipment at the end of its life, and so on, for a period of, in this case and as recommended by the WRC, a 100-year-project life.

So what you do is you assume your project is going to continue on into the future. One hundred years is elected because for the purposes

of this kind of analysis it is virtually indefinite, that any costs you carry beyond 100 years are insignificant when you bring them back to present value. So I have developed an analysis of purchasing and replacing all of the pieces of equipment throughout the 100-year life, determining what costs are, normalizing those costs, adding in the appropriate insurance costs, determining the annual fixed cost, then the hourly fixed cost, and the way you do that is from your annual fixed cost using the efficiency rates determined in the Bureau of Reclamation study. you determine an hourly fixed cost, and that's what I used. I simply then take the hourly fixed cost for each piece of machinery and multiply it by the hours required for that piece of equipment in each operation. In the case of a truck, it's on the basis of miles instead of hours, and we used the fixed cost per miles times the miles used in that operation to determine our fixed costs.

* * * * *

Q. (By Mr. Echohawk) What do you do after these fixed costs are determined?

A. By the way, that's the fixed costs for both the truck or tractor and the implements. The analysis is identical to both.

The next step is to determine the variable costs, and for these we used --

Q. Excuse me, let me interrupt you. What do you mean by "variable costs"?

A. Okay. A fixed cost is the cost like the purchase of a piece of equipment that must be incurred whether you farm one acre with that piece of equipment or whether you try to farm 500 acres with that piece of equipment. No matter what, you must purchase a whole tractor, it's a fixed cost.

A variable cost, however, varies directly with the amount of use, the hours of use or the miles of use. You have lubrication charges, repair and maintenance charges, and the more you use the equipment, the more you will incur those charges, and those costs vary directly with the hours or the miles of use.

So you simply separate those costs because you analyze them differently, and Doug Agee prepared an

analysis of the variable costs, the hourly and per mile costs for the equipment that we were using, and I used his directly and again diverted from his '77 prices to normalized 1979 prices.

Q. Was there a need to normalize the variable costs?

A. Yes, and we did that.

Q. All right. Okay, what is the next step?

A. Okay, the next step is to analyze the cost for what we call materials and custom. As you can see, in the third column there are materials involved like seed, fertilizer, and each of these have a cost, and we did the same thing as we did with the variable costs, we used Doug Agee's costs and normalized them.

Here's the place where we had to make the correction in the fertilizer and made the adjustment there. Some operations are custom operations.

Q. What do you mean by "custom operations"?

A. It doesn't make sense in all cases for farmers to buy a piece of equipment because they only use it a very little bit; that there are contractors available in the region who have that equipment, will do that operation on what they call a custom basis. It is somewhat more expensive and there are possibilities,

perhaps, for later on acquiring those specialized pieces of equipment. But, for our analysis, we chose to pay what might be slightly higher costs and hire those services out.

Q. Okay. What would be the next step after your normalization of the materials and custom costs?

A. Then we -- Yes?

Then we determined the labor costs.

Q. And how do you do that?

A. Again, we used the manhours directly from Doug Agee's budgets, and we applied the normalized cost per hour to that hourly rate and then we made an adjustment to account for the opportunity cost of that labor.

Q. Okay. We had a brief discussion earlier yesterday about opportunity costs. Could you once again explain to us what do you mean by opportunity cost?

A. Yes. This is one of the key principles that is used in an economic analysis like this one and like the ones that I've done, and they're used by the World Bank on development projects and recommended by the Water Resources Council.

The principle is this: If you are using a resource, you should cost that resource at its next

best use, and that's considered the opportunity cost.

In a situation where you have, let's say, a piece of land and it's a desert land, it has no water supply, it has nothing that it can be used for, there's no resource value for that land. The opportunity cost for that land is zero.

It's not the case here, I'm just citing it as an example. There is no alternative value to that land.

Another example might be if, say, you had a secretary in your office and for some reason for a number of weeks now you've had no work for that secretary despite the fact that you've had to pay her a salary regularly. You had no work for her, she's been doing nothing, and now you get a big piece of work, you can either give that work to that secretary or you can go out and hire a new one.

Well, clearly you're not going to hire a new one, you're going to give that work to that secretary. There's no added cost. And the analogy, I think, illustrates the point that the opportunity cost for giving that work to the secretary who's been doing nothing this time is zero. You don't incur any additional costs for doing that.

And that's the principle that we would follow here. In this case --

THE SPECIAL MASTER: Where specifically is "here"?

THE WITNESS: In labor.

In multiplying the manhours times the labor cost, the next step I did was to determine how much of thelabor cost I expect to draw from the unemployed Indians on the Reservation. There is a very large unemployed population of available work force on the Reservation, and I determined that the supply of labor is far in excess of the requirement for labor; that the skills and availability of this work force is satisfactory for the labor that is available in these new projects. And, in fact, probably would not have the opportunity to work without the development of these projects. And, as a result, I determined that 80 percent of the labor force could be drawn from that pool of labor, that pool of unemployed labor.

In fact, it's possible that 100 percent could be drawn, the supply of labor is far in excess of the demand, and it possibly could be 100 percent.

I made a judgment that 80 percent would be

drawn from that labor force, and, therefore, once I multiplied my manhours times the full labor cost, the hourly labor cost, I then multiplied by .2 to determine only the proportion that would be drawn from previously employed labor, not the unemployed labor, and, therefore, I have costed my labor at its opportunity cost, only that cost which displaces the use of otherwise employed resources, in this case, labor.

Q. (By Mr. Echohawk) Where did you get your information on the high unemployment rate on the Indian Reservation?

A. The Wind River Reservation, as most reservations, I think all reservations, maintains statistics on unemployed workers on the reservation, and I obtained my information directly from the people in the BIA who compiled those statistics and questioned them as to the composition of that work force, as well as interviewing other people who are knowledgeable in other similar situations where Indians have been employed in agricultural development projects, as well as people on the Reservation who have experience with -- historic experience with the Indians who have grown up and lived on the Reservation.

Q. In forming your analysis, did you check the long-term unemployment on the Reservation or is this just a situation that existed in, say, 1979?

A. It's actually been rather stable for about the past ten years. I didn't go back any further, but for the past ten years the unemployed rate has been on the order of 40 to 50 percent. It's currently about 45 percent.

Q. All right. So we've considered the operations as the truck and tractor implements, the materials, the truck/tractor miles, fixed and variable costs for each materials and custom labor.

What you do after you determine all of those costs in your crop budgets?

A. Once I totaled those costs, I then added a number of other costs which I'll describe now. For example, there's some general costs that aren't specifically attributed to specific operations that we call general overhead. The way that should be read at the bottom of the table, it should be read general overhead. And within general overhead, there's two items, one called miscellaneous and the next one's called interest.

Miscellaneous has been taken as 5 percent of

the above totals. In other words, all of those totals I then apply a 5 percent additional cost and I apply it at the full cost of labor. This is following Doug Agee's and a number of the other agricultural analyses that I've seen. It's really to cover things like the various overhead expenses, employment benefits, insurance, that sort of thing. And 5 percent is generally used. Since the 5 percent is applied to the fully costed values, I did that as well.

The next item called interest, in this case, is a movement in time. In other words, some of these costs are incurred by others. For example, you receive the proceeds of harvest at harvest time, but you have production costs that occur earlier. Because time has a value, time value of money, I moved my costs that are incurred earlier, in this case, the harvest time. All my costs are moved to the harvest time and, therefore, are normalized costs as of the same, all at the same time.

Q. All right. What's next after?

A. I then take a subtotal of those costs and then I have two more costs. The first one is management, and in this case I used a higher rate than is

generally used by agricultural extension service people. I believe Doug Agee uses 5 percent, WRC, Water Resources Council, uses 10 percent. I chose to use 10 percent, one, because the WRC calls for that, and, second, to further substantiate the fact that I am assuming progressive farming techniques, and to conform with the fact that I think we can obtain good yields and use progressive farming techniques, I have used the higher management costs, and that 10 percent is of the subtotals, the fully costed subtotals before I adjusted for the opportunity cost of labor.

I then made an adjustment in the management costs recognizing that we can expect some of the management to come also from the unemployed Indians on the Reservation.

Q. You expect that to come all at once?

A. No, no. I recognize that there is training involved in producing skilled managers, and through my discussions with people who had been experienced in other reservations in developing managers of this type and development projects of this type, I developed a curve which essentially assumes that the first year you will have only 10 percent of your

managers coming from the unemployed, and that each year you would be able to increase that percentage by training more and more, bringing more of the unemployed Indians into the management force, and each year you would increase that amount by 10 percent until at the end of 10 years you would have all of your managers from the unemployed.

Then to determine the specific percentage to use, I used the same kind of discounting techniques, bringing it back to the present in order to determine the percentage of management that would come from the unemployed Indians.

It's essentially then calculates the opportunity cost of management.

Q. Okay. You've been mentioning various times of bringing something back to a certain point in time and discounting. Is that what they call -- What's the term for that?

A. That's the discounting of future values to a present value. It recognizes that a future value is something less than the present value. And using the appropriate discount rate brings back that present -- that future cost to a present cost, so you can compare your costs and revenues on an equivalent

basis at one point in time.

Q. All right. What's the next item after management that you co nsidered?

A. The next item is to add in the cost for land and improvements. The improvements refer to a machine shop and shed, and I determined the cost on the same basis that Doug Agee used for his machine shop and shed. Again, performing the normalization technique that I described earlier, and then added the cost of land.

Q. What cost did you use for land?

A. Okay. Again, the same principle must be used in determining the cost of land as for your other costs, and the notion being you use the opportunity cost of land, that you must ask what is the next best use of that land. In this case, the next best use of that land is as dry grazing land. Dry grazing land value can be determined from the amount that it produces in terms of animal unit months, and we determined our cost according to the amount of animal unit months feed that that dry grazing land would produce, and that's the opportunity cost we used.

* * * * *

Q (By Mr. Echohawk) Okay. Have we now covered all items which you described as your production cost on Exhibit C-270?

A Yes, we have.

Q Once you have your production costs in reference to C-270, once you have your production costs what do you do with them?

A Looking back at Table 2, I then note the production costs for each of the crops, and then subtract those production costs for each crop from the respective gross returns for highland and lowland.

THE SPECIAL MASTER: Have you done that on a page, on a table or plate?

THE WITNESS: Table 2.

Q (By Mr. Echohawk) What page would that be in in Exhibit C-268?

THE SPECIAL MASTER: Five.

THE WITNESS: Five.

THE SPECIAL MASTER: What column shows the --

THE WITNESS: Production costs?

THE SPECIAL MASTER: Yes.

THE WITNESS: If you look under production

costs, for example, for alfalfa, you see the same number hopefully that is shown on the crop budget table in 2-A.

THE SPECIAL MASTER: You subtract that from the other two figures and come up with the next returns for the two?

THE WITNESS: Precisely.

Q (By Mr. Echohawk) And that leads us to the ending point on Exhibit C-270; is that right?

A Yes, that's right.

Q Okay. After you determined your -- or subtracted production costs from your gross returns and get your net return, what is the next step in your analysis?

A Okay, the next step in the analysis is illustrated on the next chart.

Q Would that be WRIR C-271.

A It is.

Q Would you describe for us what is shown on there briefly?

A Yes. Once I have calculated the net returns for both highland and lowland acres, I then determine the percent crop distribution for the highland and the lowland areas; that is

the amount of each crop which we will grow in the highland and lowland areas. Then by simply averaging the net returns by those proportions, they determine a weighted average of the net returns. In other words, looking at the mix of crops, each of those crops has a net return, and then according to its relative proportion in the total mix, we determine an overall weighted average for the highland and the lowland areas.

Q Would a reference point for this discussion be Table 3 in Exhibit 268?

A Yes. Yes, Table 3 shows for each of the crops in the lowland and highland regions the percent distribution, or rather the percentage that each crop comprises in the distribution.

Q How did you determine the percent distribution for each of the crops?

A Okay. As you can see from the table, the crop mix is based primarily on alfalfa. I think I discussed yesterday the fact that this is the primary crop in our mix, it has the highest yields, it is the animal food for the principal agricultural production activity

in the region, and it comprises 67 percent in growing the highland and the lowland mix. That represents four years out of the six-year rotation.

That alfalfa crop is nursed by a malt barley crop. The reason for that, I believe Dr. Woldezion described briefly in his testimony, that it's a fragile crop, and to protect it in its first year of growth it's planted with an accompanying crop, a planting crop, it's also called a nursing crop, in this case malt barley. And the percentage for malt barley, 16 percent in growing the highland and the lowland regions represents one full year of production.

Okay, in the sixth year we have a difference in the highland and the lowland areas. To begin with, let's take the highland, it's simpler. The sixth year we rotate off the alfalfa and put in entirely malting barley. It's the same crop as the nurse crop, and that shows in the highland area 17 percent. It only differs because of rounding. It's intended to represent one-sixth of the crop

rotation. In the lowland areas where it's possible to grow corn, we have included corn both in sileage and in grain in the crop mix, and you see a mix of corn sileage, corn grain and malting barley. That totals to 17 percent, representing the sixth year.

Q Once you have the percent distribution of each of the crops that you have chosen, what is the next step of your analysis?

A By weighting the necessary returns for highland and lowland areas for each crop by their respective weighting or percentage, you obtain the weighted average net returns for the highland and lowland acres.

Q Is that also reflected on Exhibit C-271?

A Yes. It's shown in the exhibit and on the table.

Q All right.

A Simply by multiplying, for example, in the lowland areas .05 times the net return for malting barley, the same way down through the crops, you obtain the weighted average.

MR. ECHOHAWK: Before we go on to the next step, we have been going about 45 minutes.

Could we break?

THE SPECIAL MASTER: Take a break? All right. We will take a ten-minute break.

* * * * *

THE SPECIAL MASTER: We'll come back to order, please. Okay, Mr. Echohawk.

Q (By Mr. Echohawk) Mr. Dornbusch, I believe we left off, we had just completed our discussion and arrived at the weighted average net returns. What's the next step in your analysis?

A The next step I think can be illustrated by the next chart.

Q Would you identify for us what has been marked as United States Exhibit WRIR C-272.

A Yes. That chart selects the portion of the overall flow diagram in Exhibit 267, which focuses specifically on the next set of steps which are also illustrated in table 4.

And what it shows, what we're doing is we're taking the weighted average of the net returns for the highland and lowland areas from the previous table and then we determine what the percentage of high land and low land acres is for each respective project area. Averaging according to those percentages, we obtained the net returns by project area and then we subtract out the on-farm irrigation costs.

If you noticed in the crop budgets, there

were no costs allocated for irrigation operation. Here is where we consider those irrigation operations. We subtract them from the net returns and obtain the net benefits by project area.

Q All right. Where did you get the percent of the acres in the highland and the lowland areas?

A That came directly from Dr. Mesghinna with Stetson Engineers.

THE SPECIAL MASTER: What are your figures in the column "present value", of your table 4, last column?

THE WITNESS: Okay. So far we've been operating completely on annual costs, and these are an expression of the stream of future costs on an annual basis. The last two columns represents a conversion from annual costs to a total present value, and what I've done is I've expressed the entire, all of the benefits.

THE SPECIAL MASTER: In what unit is that 3633?

THE WITNESS: Dollars.

THE SPECIAL MASTER: Per acre?

THE WITNESS: Per acre.

THE SPECIAL MASTER: Is this a relative figure or is that an accepted standard in computations of

this kind? I don't understand what that --

THE WITNESS: What that number of dollars means?

THE SPECIAL MASTER: What the purpose is for establishing the present value along those guidelines.

THE WITNESS: We are going to compare the present value of the benefits in the very next table to the present value of the cost to determine our ratio.

THE SPECIAL MASTER: Thank you.

Q (By Mr. Echohawk) Once again, Mr. Dornbusch, just for point of clarification we should go over it again, the principle of present value and why you've chosen the present value of certain items.

A We're, in this case, we have a stream of annual benefits and we're taking that stream and converting it to an equivalent expression. It means the same thing, but instead of expressing the benefits in terms of an annual return each year for a hundred years, we're expressing that in an equivalent number of dollars that are the present value at time zero, at our first point in

time. That stream of annual benefits is equivalent to a present value, and that's simply what we are doing, we're converting that stream to one number.

THE SPECIAL MASTER: Is this supposed to be, Mr. Echohawk or Mr. Dornbusch, a figure that is put into this case in the eventuality there would be a declaration of taking or a taking of this area of North Crowheart, say? You could conclude from this that it's present value is $3,633 per irrigated acre?

Don't look at each other. If neither one of you want to answer that, I'll accept that.

THE WITNESS: Actually I was looking at Mr. Merrill; his eyes were big as saucers.

THE SPECIAL MASTER: I'm looking, way, way beyond the lawsuit, and maybe I have no business asking this, so let's forget I asked the question now. Perhaps it can be addressed later in the litagation.

Q (By Mr. Echohawk) All right. I believe where you left off, you had obtained the percentage of highland and lowland area in each project from Dr. Mesghinna. What did you do after you

obtained that?

A Again, I used a weighting technique similar to the one I described before in order to now weight the highland and lowland returns to average annual net return for each project area. That's shown on the third column for each project area.

Q All right. And what do you do once you obtain that figure?

A Okay. We now subtract out the annual on-farm irrigation O and M costs, O and M referring to operations and maintenance, actually there's operations, maintenance and repair in there.

Q Where did you get the cost for annual on-farm O and M?

A Dr. Mesghinna gave us information regarding the number of irrigation applications that would be required in each project area.

He also gave us information on the number of acres that we could expect to irrigate for each application and the time of labor required to farm the operation. And by simply performing multiplications and calculations, we determined what the cost would be for each acre for operating the irrigation system. We also obtained form Dr.

Mesghinna, directly, the repair and maintenance costs per acre for each of the project areas, and adding the two together we obtained -- Excuse me, in the calculation of the labor to perform the operation, we did the same thing as we did in the crop budgets, we determined what the opportunity costs for that labor would be. I used the same principle as before, and we added the repair and maintenance and labor costs together.

Q All right. What did -- What was the next step?

A The next step was to add the miscellaneous overhead in the same way that we did on the crop budgets for the irrigation operation. There will also be associated overhead costs. We used the same factors as before, the five per cent.

We also moved those costs in time since they'll be occurring throughout the growing season. We moved those costs to the harvest point. And we also added a management cost using the same principle as before, the ten percent originally, and then using the opportunity cost to calculate the management cost.

And that then gave us the total for the on-farm irrigation O and M cost.

And I neglected to mention that we did this separately for hand move and side roll sprinkler systems. Dr. Mesghinna gave us separate costs for the two types of irrigation systems.

THE SPECIAL MASTER: What particular table in your exhibit 268 does that material show to which you just now testified?

THE WITNESS: The only thing that I show in this exhibit is the sum total. I do not show the calculations that go behind this.

THE SPECIAL MASTER: I see. So the materials you just testified to would fit in somewhere with the annual on-farm irrigation O and M costs on page 12?

THE WITNESS: Yes, since we did the calculations separate for the side roll and hand move, the very next step was to determine the weighted average and Dr. Mesghinna told us the portion of side roll and hand moved sprinklers that will be in each project area, and taking the weighted average for those costs we determined then the numbers you see in table 4, which is a weighted average of the annual on-farm irrigation costs for both side roll and hand move, according to their respective

proportion.

* * * * *

Q (By Mr. Echohawk) Is there anything else that goes into the annual on-farm irrigation O and M costs?

A No, I believe I have covered it.

Q What do you do with that annual on-farm O and M cost?

A That is subtracted from the annual average net return to obtain the next to last column, which is the annual project area net benefit per acre.

Q Again, then you determined the present value?

A That's right. I took the annual stream -- the stream of annual benefits and converted that to an equivalent present value.

THE SPECIAL MASTER: Would you go through one more time the formula you used in arriving at present value?

THE WITNESS: I'm sorry?

THE SPECIAL MASTER: Can you give me that formula that you used one more time -- you took the annual project area net benefits per acre and projected it over the life of the project.

THE WITNESS: Correct.

THE SPECIAL MASTER: Then what did you do with that? Give us -- you obtained a present value by a formula doing what?

THE WITNESS: Okay, the formula essentially does the following. If I were to say to you I'm going to give you a choice, I'm going to give you $100 today --

THE SPECIAL MASTER: You went through this yesterday, I remember that.

THE WITNESS: Okay.

THE SPECIAL MASTER: But is there a formula that you put in the computer to arrive at this?

THE WITNESS: There is. I don't recall the formula offhand, but essentially it takes a rate of return and converts a stream of annual payments. It's just like a mortgage, the same calculation that you use to produce a mortgage. If you take out a $50,000 mortgage --

THE SPECIAL MASTER: Present value, yes.

THE WITNESS: To give you the annual stream you are going to pay for the 30 years --

THE SPECIAL MASTER: It can be based on so many factors: Anticipating rates in the

future, whether a variable is adjusted in another form, whether you are taking in the natural cycle of years of lesser water and higher yields, all these things have an affect on that, and I wonder how you arrived at it.

I'll just quick do Mr. Merrill's work now. Let's go -- go ahead and ask your questions. No, it's not your work, it's my work, too.

THE WITNESS: I'm pretty sure we are going to cover all those questions.

MR. ECHOHAWK: We are getting close to that.

Q (By Mr. Echohawk) Mr. Dornbusch, after we have arrived at present value of the project area net benefits per acre, what is the next step in your analysis?

A Okay, the next step I think you can illustrate in the next table -- the next exhibit, excuse me.

Q Would you please identify for us what has been marked as United States Exhibit WRIR C-273?

A Yes. It shows the portion of the flow diagram that's illustrated entirely on Exhibit 267, and it shows how we now complete the analysis by taking the net benefits by project area,

which I just mentioned, dividing them by the irrigation system costs present value, to obtain the benefit cost ratio for each project area, which then is what you might call the bottom line, it shows you the feasibility of each project area.

Q Where did you get the system, irrigation system cost?

A From Dr. Mesghinna. I obtained his calculation of the cost per acre in 1979 dollars of the separate components which would make up the installation costs of the entire system.

Q All right. And what components would those be?

A Those components included the following: The on-farm systems, which are the actual sprinkler systems; the pipe network; the pumps and pumping plants and the canals and related structures -- and excuse me, also the drainage, the cost for drainage.

THE SPECIAL MASTER: Ms. Reporter, would you be kind enough to read that answer back to me, please?

(Whereupon, the Reporter read back, "A Those components included the following: The on-farm

(systems, which are the
(actual sprinkler systems;
(the pipe network; the
(pumps and pumping plants
(and the canals and related
(structures -- and excuse
(me, also the drainage,
(the cost for drainage."

Q (By Mr. Echohawk) Mr. Dornbusch, I show you what has been entered into evidence as United States Exhibit WRIR C-245, which is the report from Dr. Mesghinna entitled "Conceptual Irrigation Development Plan and Irrigation Water Requirements, Wind River Reservation, Wyoming." In that exhibit I direct your attention to Page 42, Table 24. I notice on the left-hand column under "Description" it mentioned on-farm systems and so forth. Are those the same components that you just described?

A They are.

Q And are the costs reflected for each of those components the same that you considered in your analysis?

A They are, uh-huh.

Q Okay. What did you do with those costs provided you by Dr. Mesghinna?

A All right. To make things clear, you can see in that table there are other costs. In my discussion I'm going to cover all of them, but I think to keep things simple I'll deal with one section first, and that section will consist of the pipe network, the pumps and pumping plant, the canals and the related structures in the drainage.

THE SPECIAL MASTER: For which unit?

THE WITNESS: Pardon?

THE SPECIAL MASTER: For North Crowheart?

THE WITNESS: I'm just dealing conceptually for all the areas. I'm going to describe what I did with those costs.

THE SPECIAL MASTER: All right.

THE WITNESS: The reason I'm breaking out those four is that those four are the bases for determining the engineering and contingencies costs. I did not use Dr. Mesghinna's costs directly. I'll explain why.

I'm going to have a series of operations for adjusting those costs. The first one, for example, is the normalization. I took his 1979 costs and converted them to 1979 normalized costs

using the appropriate factors. There are other --

THE SPECIAL MASTER: What do you do, crank in an inflation factor? What else?

THE WITNESS: Now, in order to convert from a 1979 cost to a normalized cost, you multiply by a factor which takes -- accounts for that smoothing operation I talked about before. It's the same principle of the normalizing of the returns to crops, the cost for production. It accounts for the fact that if you want to buy an on-farm system in 1979, that it may be higher or lower than what is the truly representative price.

THE SPECIAL MASTER: Do you have that formula that you applied?

THE WITNESS: Okay. Now, the way to determine the normalizing factors is the following: The WRC applies an analysis to historic prices through time, and what they seek to do is develop a formula which will take four years of prices to predict the fifth. In other words, they perform an analysis over a long period of time to the actual prices.

The technique is a multiple regression analysis technique, it's essentially a statistical approach for determining what the smooth curve is thorugh historic prices. And what the objective,is, to develop a set of weightings for four years which will accurately predict the fifth-year price. Then if you take those four years weightings and apply them to a history of four years, it will give you what should be the normalized price in the fifth year. So it seeks to use a history of prices in order to predict the normalized price in the fifth year. Okay?

THE SPECIAL MASTER: I think so.

THE WITNESS: Okay. Within that technique they recognize the principle that the later years are more representative than the earlier years, and what they seek to do is to come up with a set of weights, which is the formula, which predict the fifth-year price on the basis of the earlier four years.

Now, the WRC makes a fundamental mistake in that they ask you to normalize returns, but not costs. When there is no inflation, that's

not a bad thing to do necessarily, assuming the costs do not have these fluctuations that you have to worry about. If costs are relatively stable and current costs are representative, then there is no need to really normalize. But when you have inflation, the normalization process has the effect of taking your returns and -- because you are weighting by earlier years -- of moving that normalized price back in time effectively by about a year. Now, if you used normalized returns and you use that price that is effectively a year old and you compare it with costs that are current costs that have the inflation of that year, in effect you are using costs that are inflated by a year that you are not using for prices, and the effect is to overstate your costs relative to your prices.

Now, we identified this problem. It is actually one that has only become a problem recently because of inflation, and we contacted the WRC and we pointed this out to them, and their staff has acknowledged to us that we

have identified a key problem and they are now in the process of considering a change in their principles and standards to make their costs consistent, the process for computing their costs consistent with the process for computing their returns.

So because the WRC did not publish a normalized factor, which would have made it very simply like if they would have just published a number like they did for our other costs, we could have multiplied by '79 and converted. We went back and went through the same process WRC had gone through for normalizing their prices and presumably would do for costs, and used what they call this regression-lag technique and entered history, I believe it was 50 years of costs, and determined the weightings, the formula for those four years to predict the fifth, and using those weightings determined the normalizing factor to be applied just as the WRC presumably would have done.

So we determined on our own what the normalizing factor should be for each separate

system, applied that factor to convert Dr. Mesghinna's '79 prices to normalize seventy-nine.

* * * * *

THE SPECIAL MASTER: Well, if Dr. Mesghinna's prices on North Crowheart would have been taken as 1837 total investment --

THE WITNESS: Yes.

THE SPECIAL MASTER: -- plus the -- Well, can you take the recurring costs, O & M, energy and demand -- I guess you can't.

THE WITNESS: This is the way we did it. We focused specifically on each of the items of cost structures, the on-farm system, the pipe network and the pump and pumping plants. You see, each one of those have different normalizing factors.

THE SPECIAL MASTER: You adjusted those each individually?

THE WITNESS: Each one individually.

THE SPECIAL MASTER: And the total, instead of 1837, you came to 2474, is that right, for North Crowheart?

THE WITNESS: That's right.

THE SPECIAL MASTER: And if you would use any figure less than 2474, your benefit-cost ratio would have been larger than 1 to 1.7, it would have been 1 to 1.8; is that correct?

THE WITNESS: If I understand you, if you used a lower estimate cost, the ratio would have been

higher?

THE SPECIAL MASTER: Yes.

THE WITNESS: That's correct, that's right. If I had used 1837 and then an annualized --

THE SPECIAL MASTER: 36, you would have almost the 1 to 1.7 to 1 to 1.8?

THE WITNESS: Well, I would have to annualize his annual returns, so I would have to add something to that 1837. Yes, sir, if the cost came out lower, the benefit-cost ratio would have come out higher.

THE SPECIAL MASTER: Okay.

Q. (By Mr. Echohawk) Mr. Dornbush, you took the costs for, presented in Table 24 of Exhibit 245, and normalized those to 1979 prices; is that right?

A. That's right.

Q. So it's not really the figures as shown in these tables that actually are going to be compared to your benefits, it's some derivation of those figures?

A. That's right.

Q. Normalization of those figures?

A. Well, first, normalization and then some other steps.

Q. What do you do after you normalize those?

A. After I normalized, I also had to recognize that each of these systems, like the farm equipment, had

a life, and that they would not be developed, and you incur the cost only the first time, first year, but they'd have to be replaced according to their life. And I obtained from Dr. Mesghinna the expected life of each of those separate components of the system, and then made a calculation to determine what the present value would be of building and then replacing each of those systems for a 100-year period.

Q. Okay. So we're attempting to bring all the costs back to present value to compare to the present value of your returns?

A. That's where we're headed.

Q. Okay. Once you determine the present value of the pipe network, the pumps, the pumping plants, canals and related structures and the drainage, were any adjustments made to those present values?

A. Yes. Those four components are the ones upon which the 25 percent engineering and contingencies are calculated. And here you can see, if I used the 25 percent, first, I'd have to make the same kinds of conversions all the way down the line, and it was just as simple to leave engineering and contingencies aside for the time being, make the calculations for those four components and then take the

engineering and contingencies, so I normalized those four components, I considered the expected life, determined their present value, and then I took the 25 percent.

Q. Were any adjustments made to the four items; the pipes, the pumps, the canals and the drainage for -- Was there an adjustment for an opportunity cost?

A. Yes. Within the development of each of these systems, within the construction of these systems there is a component for labor. And I considered the fact that many of the laborers who would work on a construction project could be drawn from the unemployed labor force on the Reservation.

However, I did not assume the same rate that could be drawn for skilled and unskilled. I made a distinction, I used the same estimate for the unskilled labor, but recognizing that the unemployed Indians may not have all the skills required for construction and there would not be time for a training program if you're going to construct it now over the next few years, that a lower proportion could be drawn from the unemployed labor force. And, therefore, in calculating the opportunity cost for labor, I made separate considerations for the skilled

and unskilled in order to adjust those additional costs.

THE SPECIAL MASTER: Are those adjustments -- Well, strike that. No question.

Q. (By Mr. Echohawk) Okay. All right, I think we left off, after you determined the present value for the pipes, pumps, canals and drains, you applied the contingency factor; is that right?

A. That's right.

Q. Where did you get this contingency factor?

A. Tom Stetson was the one who estimated that 25 percent of those four system components, the pipe networks, pump and pumping plant,canals and structures and drainages, 25 percent of those costs would comprise the engineering contingencies.

Q. Is Tom Stetson associated with Dr. Mesghinna?

A. Yes, he is.

Q. And how so?

A. Tom Stetson, I believe his title is the President of Stetson Engineers.

Q. All right. Is the engineering contingencies shown also on Table 4 of Exhibit C-245?

A. Yes.

Q. All right. After you apply 25 percent contingency,

what did you do next?

A. Okay. Now, just to keep track of where we are, I have normalized in present value and made an adjustment for opportunity cost of labor for those four components and then calculated the engineering and contingencies. The on-farm system, I normalized and took a present value, I made no adjustment for opportunity cost of labor.

So I have now made my calculations of all of the cost components that are shown in the first portion of Dr. Mesghinna's table, Table 24, Page 245, of Exhibit 245.

However, those components just comprise the total investment of the system which he designed. There are additional costs to be considered.

Q. What would those costs be?

A. Okay, there are two more costs. They are fencing and land preparation, and then an additional adjustment to move these costs in time, recognizing that they'll, the construction period will occur over a period of time, same way I moved costs before.

Q. Okay. The fencing and land preparation costs, are they sometimes referred to as -- Do they have

another name?

A. I don't think so.

Q. The fencing and land preparation, do those have --

THE SPECIAL MASTER: Leveling.

THE WITNESS: Fencing is fencing.

Q. (By Mr. Echohawk) Are they sometimes called installation costs?

A. Not the fencing.

Q. Okay, my fault.

Okay. How would you determine the fencing cost?

A. Okay. I see where you're at. The fencing has an installation cost, there's a cost for installing the fence.

Q. Okay.

A. I determined what the cost per mile would be for installing the fence.

Q. How did you determine the cost per mile?

A. I obtain information locally from the BIA people familiar with the cost of fencing in that area, and I also corroborated their numbers with information from Agricultural Extension documents.

Q. Okay. What did you do once you arrived at the cost per mile for fences?

A. Okay. I made an adjustment again for the opportunity cost of labor, recognizing that much of the labor for installing those fences again could be drawn from the unemployed people on the Reservation.

I then recognize that fences do not have an expected life and I calculated what the present value would be for the fence per mile, recognizing that it would be installed and replaced for the project life.

I think --

THE SPECIAL MASTER: How many times would it be replaced in the project life?

THE WITNESS: Expected life for a fence is 25 years, so it would be replaced --

THE SPECIAL MASTER: Replaced four times in the life of the project?

THE WITNESS: Well -- Yeah, that's right.

Q. (By Mr. Echohawk) All right. Once you determine the price of the fence, fencing costs, any other costs considered?

A. Well, then the way I computed the amount of fence required for each of the project areas, I had one of my staff consult with one of the staff of Stetson Engineers and together they determined where the fences would be required. We recognized the

additional fences, we recognized canals are already fenced. Dr. Mesghinna has included within his cost of the canals, cost of fencing and, therefore, we did not duplicate the fences that are already provided by the canals.

We determined where the additional fences would be necessary, and together they sketched on a map of the project areas where the additional fences would be, then measured the fence miles in each project area. And from the fence cost per mile and the miles of fence for each project, we determined the total cost of fence for the present value of fence for each project area.

Then dividing by the number of acres in each project area, we determined the cost per acre of fence.

Q All right. What's the next consideration after you did the fencing cost?

A. Okay. The next consideration is the land preparation. This recognizes the fact that those acres are not really ready for farming and that there's a considerable amount of effort that has to be made before they'll be ready for farming, and we consider those costs as well.

Q. What sort of things would you have to do to the land?

A. You must clear the brush, you must break up the soil, there's a small amount of leveling that has to be performed. I think, as Dr. Mesghinna talked about earlier, there's also some additional fertilizer that would be necessary in some of the areas; some cobbles, some stones that need to be removed, and these include costs for all of those.

Q. How did you estimate the cost for the brush clearing or the other such items?

A. I discussed this, these costs, with the Bureau of Reclamation, who have made similar calculations in areas near and on the reservation, and obtained advice as to the amount of costs which they thought would be appropriate for at least a portion of that preparation.

With them, I discussed things as brush clearing, soil breakup, leveling and those factors.

I then interviewed a number of people who advised me on the amount of fertilizer that might be required over and above what I had already included in any budgets which would raise the fertilization level of the soil in the early years, and determined the cost of the extra fertilizer required.

Q. Who were those people that you discussed that with?

A. I discussed that with Stan Wilson, who's with the Farmers Exchange in Riverton, and with Hugh Huff, a soils expert with the Agricultural Extension Service, Wyoming.

THE SPECIAL MASTER: University of Wyoming?

THE WITNESS: University of Wyoming, yes, with Agricultural Extension.

Q. (By Mr. Echohawk) I also believe you mentioned some rock removal. Where did you get the cost estimates for those?

A. Rock removal was a problem. We couldn't find any custom operators in the area. That would have been a simple way to do it, just hire that service out. So we had to determine the cost of acquiring equipment and operating that equipment, and that's precisely what we did.

THE SPECIAL MASTER: What kind of equipment?

THE WITNESS: Rock removal equipment.

THE SPECIAL MASTER: Sounds like going around in a circle.

MR. ECHOHAWK: I believe they're called rock pickers.

THE SPECIAL MASTER: I won't ask any more.

THE WITNESS: Yes, they are rock pickers, exactly.

Q. (By Mr. Echohawk) All right. What sort of cost considerations are there in acquiring that equipment?

A. We performed the same kind of analysis as we did for the fixed -- for the equipment in the farm budgets. We recognized fixed and variable costs. We recognized the number of acres that had this rock problem and the time involved in removing the rocks and ran our cost estimates the same way we did for the fixed and variable costs for farm implements and equipment.

* * * * *

Q (By Mr. Echohawk) All right. Are these all the additional costs you determined over and above Dr. Mesghinna's?

A They are. That's right, and then we made the estimate of how much additional costs would be required for moving those costs in time to what we call times zero, the beginning of the project.

Q And how did you do that?

A I consulted with Tom Stetson of Stetson Engineers, and he advised me as to what the schedule, expected schedule could be for the construction of the various components of the system for the project areas. And I developed a schedule which shows the construction program, then I recognized that because these costs are spread out in time, that there will be a cost incurred, just the time value of money, in moving those costs to times zero. It's the same idea as the financing of your construction project, if you borrowed money while you were developing a construction project. The principle is the same in moving them in time to times zero.

So we did that, and we estimated the cost for discounting those to times zero.

Q After you discounted this to what you call times zero, what did you do next?

A Next we focused on the operation costs, which are shown in Dr. Mesghinna's Exhibit 245, Page 42, the O and M costs, the energy costs and the demand costs.

Q What did you do with those?

A The first thing we did was to normalize them and determine the 1979 normalized price.

Q Okay. What did you do after you normalized them to 1979?

A We recognized the fact that the operation, maintenance and repair have a labor component, again, some of which could be drawn from the unemployed labor force on the Reservation, and therefore recognized the opportunity cost of that labor and made an adjustment for Dr. Mesghinna's OM and R costs.

THE SPECIAL MASTER: By reducing it?

THE WITNESS: By reducing it, yes.

Q (By Mr. Echohawk) What did you do next?

A The energy and power, there was no other

adjustment besides the normalization, and for each of those we then discounted the future stream -- those are annual costs -- the future steam of those annual costs to a net present value and, therefore, we now have the net present value of all costs, the installation costs and the operation costs, the annual operation costs in the future.

THE SPECIAL MASTER: But there was no calculation you made that would take care of the contingencies of the inevitable increased energy costs over the decade, was there, assuming they are going to be inevitable?

THE WITNESS: We considered that, and I'll explain that. Perhaps I can just with a sentence close up this conclusion and get to that question.

We then added them up, determined the net present value of the costs, divided the net benefits by those costs -- or I should say those costs as shown in my Table 5, made the division that I just referred to, the net return by the system costs, to get the ratios.

THE SPECIAL MASTER: Yes.

THE WITNESS: Okay. Now, inflation.

THE SPECIAL MASTER: Not so much inflation, but increase in rates.

THE WITNESS: Increase in rates.

THE SPECIAL MASTER: Brought on by inflation.

THE WITNESS: There are really two things that will increase energy costs, one is the inflation, just the value of the dollar, and we have that problem with all costs. We also have the problem of the fact that different resources may become more or less scarce in the future, and the more scarce resources -- the cost of those resources will be reflected in increasing costs. Okay, the first problem is that is -- it's very unclear how those costs will increase over the future because of scarcity. We consulted with a publication, I'm trying to -- I don't recall the title, but within that publication we found projections made by the U.S. Department of Energy for the increases over and above inflation that might be expected for energy. Based upon their projections, we determined that the increase

would be negligible, and we chose not to inflate energy costs any higher or lower than any of the other costs.

Now, I realize, as I'm sure everybody does, that in the near term this looks like this may differ from what we are experiencing. The problem we are facing is that we have a long-term project for 100 years, that is one thing; the second thing is that in order to anticipate what the supply of energy resources will be, it's necessary to get into a whole analysis of supply of the particular energy resources that will be used to generate energy in that locale. I believe coal is considered to be the primary resource for that region, so we did focus on coal, but we also had to recognize the fact that at some point in the future we may be coming up with alternative energy resources that may or may not be competitive with the existing energy resources.

In short, it's a formidable problem, it's not an easy problem. I don't say that there is a magic answer to it. But we also have the situation that the demand for food is going to

be increasing, and we only have a fixed supply of land. Okay, you also have the problem here of trying to compare the demand and supply of food resources and what is going to happen to the increase in cost of that scarce resource. And you really are faced with the same kind of problem, how do you recognize what foods will be consummed, what technologies will be used, and you really have a very difficult problem, and I don't -- I'm not going to minimize it. I think it is formidable.

This then goes to the type of method which is expected of an economist to use in performing an analysis of this type. There are really two methods which are acceptable, and it focuses directly on the question of inflation. Okay, the first method would seek to recognize inflation into the future. It would seek to recognize that our costs are going to inflate in the future and our returns are going to inflate into the future. Now, recognizing that is a difficult problem, there is also a method, an equivalent method, which says that you do not recognize that either costs

or returns will inflate into the future, and as long as you do it for one and you do it for the other -- you are all right as long as you don't increase, inflate your returns and hold your costs constant, you treat them at a fixed period of time and assume that they are going to be constant into the future.

It essentially says look, I don't know what inflation is going to be. But recognizing it is going to occur for both of them, it is proper to account for both of them the same way. Recognizing some may go up more than others, let's avoid the problem and assume constant costs into the future.

Now, so you have two basic methods. Within each of those methods you recall we are talking about discounting this future stream of benefits and costs back to the present. If you use the first method that I described that inflates costs of returns into the future, the proper discount rate should be one that also has inflation because if I'm going to loan you money and you are going to be paying me back with inflated dollars, dollars

that have less value, I'm going to want more dollars back over and above what I expect on the return of my investment because if I know that you are going to pay back the loan in ten years and the value of those dollars is going to be ten percent less, I want ten percent more dollars to account for the difference.

THE SPECIAL MASTER: What if I don't want to give them to you, give them at the rate the market determines on that factor?

THE WITNESS: If I have to go to court to sue you --

THE SPECIAL MASTER: No, I'm trying to determine how -- how in the real world are these rates determined when you talk about a discount rate over ten years? They are determined by the market, by the negotiations free men engage in while ready, willing and able to engage with each other.

THE WITNESS: That's right. That's right, and now, that's what I was getting to. If I'm going to loan you money and you are going to pay me back at some point in the future, we are going to negotiate a rate, and the first

thing I'm going to do is I'm going to want a return on my money because it has a value to me. There is going to be a proportion of that interest I will want anyway, no matter what inflation is. Over and above that I have to account for the fact you are going to pay me back in cheaper dollars in the future, so I add an additional portion for the future. Now, I also look at you and I assess the risk, how risky it is --

THE SPECIAL MASTER: That took care of that discussion. Well, this is a little afield when the -- not too much, though. In this matter there is no market, open market comparison we can use to change into a benefit cost ratio. There are other socioeconomic historic governmental factors, equitable factors that we raise in this case touching that, but this becomes such an uncertain science.

THE WITNESS: That's right. It is uncertain what the future inflation is going to be, that's right. And what I'm getting to is because of that uncertainty it's just as proper to go to the second method where we are not

anticipating inflation for returns and costs, and if you do that, then the proper discount rate to use is one that also has inflation removed. So you can see that if you now had a crystal ball and could anticipate inflation into the future for returns and costs and you put that inflation into your returns, into your costs and into the discount rate, you would make a benefit cost analysis that would be a correct one. Now, if you don't have a crystal ball and you did not inflate your returns and your costs into the future, then the proper rate to use was one that was net of inflation, and the two would yield the same results, one with inflation, one without inflation.

Now, the WRC and the World Bank and all the rest of the financial institutions that I'm familiar with who do these kinds of economic analyses recommend that you use return and costs which do not include inflation. The proper rate, therefore, to use is also one that does not have inflation.

Our next problem: Historically we have

only here -- at least in the United States -- experienced high rates of inflation relatively recently. In the early '60s we had very low inflation, and at that time the discount rate which was used, for example, in analyzing development projects like this in the United States was one that was net of inflation, there wasn't inflation. The long term, average long-term cost of borrowing by Uncle Sam was a rate that was down in the range of about three percent. In the later years, in the middle and later '60s and in the '70s, we experienced growing inflation. The long-term rate started to grow with that inflation. The problem came in that the recommended rate to use was not kept at that rate which was net of inflation. They allowed the discount rate to increase.

Now, there may be a number of reasons for this. I could speculate on some of them, but the net effect has been to call for a method which uses benefits and costs which do not have inflation, but a rate which has some amount of inflation, not the full amount, but some amount of inflation. So actually where we stand today

is a discount rate.which is either one way or the other, it's not fully inflated and not fully net of inflation. It's not the proper rate to use when you use benefits and costs which are net of inflation. That comes to the end of my story.

Therefore, I performed some research to determine what that rate is, the proper rate to use, which is net of inflation, and the answer is the answer to your question earlier, is the four percent, and that's the rate which I determined to be the proper rate to use in these circumstances, and that's the rate I have used to discount the future stream of benefits, the future stream of costs, the time movement of all of my costs to times zero.

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MR. MERRILL: Your Honor, I apologize for interrupting Mr. Dornbusch --

THE SPECIAL MASTER: I would commend you now for not having interrupted for most of the morning.

MR. MERRILL: I'm going to get even now, Your Honor.

THE SPECIAL MASTER: I imagine you will when you cross examine. Go ahead.

MR. MERRILL: I move to strike the answer concerning the real rate of interest. I think that it's clearly, in light of facts of life that everyone in the courtroom knows today that to use a four percent discount rate to evaluate a project of this type is so absurd as to be unreasonable and therefore not probative evidence, and move that comment about four percent be stricken.

THE SPECIAL MASTER: You needn't respond. I will, as a matter of trying to keep an even hand and recognizing what you say may be true, and I'll give you a chance to prove it, but for the purpose of striking evidence, I will not do so.

dornbusch-direct-echohawk

MR. ECHOHAWK: That's my point exactly. We can't take Mr. Merrill's opinion for what he thinks it is. We're dealing with expert testimony. If he wants to present his own testimony through his experts, that time will come.

THE SPECIAL MASTER: Gentlemen, this subject matter is so complex in the great central banks of the nation, it's so complex in the annals of government and the Treasury Department that I think of nothing that I find is more challenging, more vacillating and more difficult than what we're talking about right now, and I keep thinking to the end of it all, for what purpose are we trying to achieve this? Are we trying to hold down inflation, spurts of economy because of unemployment, help some hospitals that need some payrolls like in Denver, where they have laid off 323 people this morning in Denver General Hospital? What is the end purpose of it all? And if you're going to the World Bank you need some figures that will justify a loan, even at a minimum rate because, you know, one hundred percent of the dollars are being spent in your nation where the money needs to be spent. So

these factors, in this case, some equity has to be done if there are water rights in existence, but the water rights cannot be willy-nilly granted if the use of it is to be wasteful and improper. So that's the challenging, baffling thing, things that are my headache, not yours.

Go ahead, Mr. Echohawk, unless you want to take a break.

MR. ECHOHAWK: I think it would be, maybe a short break, and then we can --

THE SPECIAL MASTER: All right, off the record.

(Thereupon a ten minute recess (was taken.

THE SPECIAL MASTER: All right. Could we please come to order, please.

Mr. Echohawk.

Q (By Mr. Echohawk) Mr. Dornbusch, before we launched into the discussion on the discount rate, we were just getting close to finishing up the discussion on table 5. I think we had arrived at the present value of the system costs, and I think it was just a matter of comparison. Would you briefly sum that up as to how that all happened.

A All right. Once we calculated the present value of the system cost for each project area, we then divided the net returns, present value of the net returns for each project area by the present value of the system cost to determine the benefit cost ratio, which expresses the feasibility, and as you can see, that concludes our analysis and domonstrates feasibility.

Q For each of the projects, to the five projects, could you give us what the benefit cost ratio is for each project?

A Yes. For North Crowheart --

MR. MERRILL: Your Honor, objection; the witness is testifying right out of the exhibit.

MR. ECHOHAWK: Your Honor, he could go to his notes and say the same thing.

THE SPECIAL MASTER: You may do what, Mr. Echohawk?

MR. ECHOHAWK: He could read it off this page or read it off any other page.

THE SPECIAL MASTER: I'll overrule the objection, since I've overruled the other objections anyway.

THE WITNESS: For North Crowheart, the

benefit cost ratio is 1.47. For the South Crow-heart, the benefit cost ratio is 1.29. For Big Horn Flats, the benefit cost ratio is 1.07. That's 1.07. For Riverton east, the benefit cost ratio is 1.25, and for Arapahoe the benefit cost ratio is 1.53.

MR. MERRILL: Your Honor, I think the record ought to reflect that the benefit cost ratios just testified to by Mr. Dornbusch are assuming a discount of four percent.

MR. ECHOHAWK: Your Honor, we don't have to have Mr. Merrill's narrations of what's going on through the United States' direct case.

MR. MERRILL: Your Honor, I simply wanted to point out that in the absence of a discount rate, a cost ratio is an ambiguous term, and the record ought to reflect what particular discount rate is assumed when these figures are read into the record.

MR. ECHOHAWK: We've had testimony on that.

THE SPECIAL MASTER: It's in now; go ahead, Mr. Echohawk.

Q (By Mr. Echohawk) Mr. Dornbusch, as a result of your economic feasibility analysis of the five

projects that you just listed, in your professional opinion, are the five projects listed economically feasible?

A Yes, in my opinion all five projects are economically feasible.

Q Mr. Dornbusch, I ask you to turn to, go to Exhibit C-268, just briefly run through your results. Your professional opinions in regards to Table 1 for the crop yields and prices and gross returns, reflected upon Table 1, page four in Exhibt C-268?

THE SPECIAL MASTER: Are you repeating everything that's already in the record?

MR. ECHOHAWK: I'm saying is his professional opinion reflected on this particular table for these particular items listed.

THE WITNESS: Yes, my professional opinion for each of the items noted in the table, the crop yields, prices per unit and annual gross returns are reflected in that table.

Q (By Mr. Echohawk) Similar answers of your professional opinions for the appropriate items that are reflected on each table, 2 through 5; also reflected in Exhibit 268?

A Yes.

Q Is it your professional opinion, Mr. Dornbusch, that four percent is the appropriate discount rate to use in making this analysis?

A Yes, it is. I should clarify that. In my professional opinion, the correct rate is in the range of two to four percent, and it's probably not over four percent. Any rate in that range would also show the projects to be feasible and therefore, applying the four percent rate also shows the projects to be feasible and is an appropriate rate to use.

Q Okay. Is the four percent rate which you testified to as being net of inflation, the appropriate rate to use when you're costs and benefits are net of inflation?

A Yes. No higher than the four percent is the correct rate to use, and therefore, four percent is a conservative rate, and I feel is the correct rate to use.

MR. ECHOHAWK: Your Honor, could I have one moment, please?

(Brief pause.

MR. ECHOHAWK: Your Honor, at this time I

would offer into evidence Exhibit C-266, which is the resume of Mr. Dornbusch; Exhibit C-267, which is the overall chart entitled "Economic Feasibility Analysis Process, Irrigated Agriculture, Wind River Reservation, Wyoming"; Exhibit C-268, which is the report entitled "Economic Feasibility of Irrigated Agriculture Development"; Exhibit C-269, which is the chart, "Irrigated Agriculture Tables Content, Table Two"; Exhibit C-271, which is a chart, "Irrigated Agriculture Tables Content, Table Three"; Exhibit C-272, which is the chart entitled, "Irrigated Agriculture Tables Content, Table Four"; Exhibit C-273, which is the chart, "Irrigated Agriculture Table Content, Table Five". I'd like to offer those into evidence.

THE SPECIAL MASTER: Do you wish to voir dire, Mr. Merrill?

MR. MERRILL: May I first inquire as to the purpose of the offer of each of these exhibits?

MR. ECHOHAWK: To show the results of Mr. Dornbusch's economic feasibility analysis.

THE SPECIAL MASTER: For the truth of their contents.

MR. ECHOHAWK: Yes. Well, this represents what -- The charts show -- to illustrate for illustrative purposes, to show the method he used, and the report as a breakdown of -- shows results of his feasibility analysis.

MR. MERRILL: Your Honor, the State of Wyoming has no objection to the admission into evidence of Exhibit C-266, which is Mr. Dornbusch's resume.

We also have no objection to the admission of Exhibit C-267, which is the overall process chart and as long as it is admitted for only illustrative purposes, to show the overall stages of Mr. Dornbusch's analysis. Likewise, we would have no objection to the admission into evidence of Exhibit C-269 through 273, which is simply partial derivatives of that same chart for the same illustrative purposes.

I object to the admission of Exhibit C-268, first on the ten-day rule. This exhibit was supplied to the State of Wyoming in its present form Monday of this week, therefore, we've had it four days. I discussed this matter informally with counsel for the United States and Tribes

off the record yesterday. I'm willing to weigh the objection if counsel for the United States and Tribes will stipulate to the Court's entering an order now revising the ten-day rule to a five-day rule.

THE SPECIAL MASTER: I apologize to both of you gentlement I've got that order drafted, it's in our office and I haven't signed it this week. I would have it to you Monday, it will be present next Monday morning, next week sometime, so I appreciate your waiving the objection to it for that reason.

MR. MERRILL: I will do so if counsel for the United States will stipulate to your entry of the five-day order.

THE SPECIAL MASTER: I'm going to order it.

MR. ECHOHAWK: That's fine.

MR. PERRY: We agree to that anyway.

THE SPECIAL MASTER: Thank you.

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MR. MERRILL: Your Honor, I also have evidentiary objections to Exhibit C-268, as I'm sure you are aware, which is Mr. Dornbusch's report. I see no way to properly voir dire the exhibit without lightly overstepping the bounds into cross-examination since the report and his work are all so thoroughly integrated. Let me simply object at this time to the admission of that document into evidence on foundation grounds, and I will point out my objections to the Court during cross-examination. And anticipating now that you will go ahead and admit the exhibit, I will make an appropriate Motion to Strike.

THE SPECIAL MASTER: All right, I would admit all of the -- I beg your pardon -- all of the exhibits referred to by Mr. Echohawk just now and identified and offered for admission into evidence be and the same are hereby admitted into evidence.

Do you have enough information for identification for your report?

MR. SALAZAR: Yes, I do.

THE SPECIAL MASTER: Okay, go ahead, Mr. Echohawk.

I think we ought to call C-268 the Dornbusch report, Economic Feasibility and B-C Ratio, something

like that.

MR. ECHOHAWK: All exhibits are admitted then?

THE SPECIAL MASTER: That is correct.

MR. ECHOHAWK: As I understand, for all practical purposes, we are operating under the five-day rule?

THE SPECIAL MASTER: For all practical purposes, wenare. It is ready to be signed and should have been signed, it's in my office. That does not include motion time, unless you want it to include motion time.

MR. MERRILL: I think we ought to stick with the ten-day rule for motions, Your Honor, unless all counsel waive it as to particular motions.

MR. ECHOHAWK: I think so.

THE SPECIAL MASTER: Ten days it is.

MR. ECHOHAWK: Your Honor, at this time that concludes my direct examination of Mr. Dornbusch.

THE SPECIAL MASTER: Mr. Merrill, would you wish to -- Does anyone else have further cross-examination at this time?

MR. PERRY: Your Honor, the Tribes will have some cross-examination. I wonder if we might begin that on Monday morning?

MR. MERRILL: That would be fine, Your Honor.

The proceedings have been normally the Tribes cross-examine before we do, and that would be fine.

Before we go off the record, I would like to point out for counsel and on the record that Wyoming's cross-examination of Mr. Dornbusch may be extremely short, and I want counsel for the United States to be advised of that fact so we don't have a problem concerning availability of subsequent witnesses.

THE SPECIAL MASTER: Do you feel you may be within a half of a day on this gentleman?

MR. MERRILL: Your Honor, it could be much shorter than that.

THE SPECIAL MASTER: I hope, Mr. Echohawk, you might have Mr. Stetson here Monday afternoon, Tuesday morning at the latest.

Very good. Thank you for your thoughtfulness.

MR. CLEAR: Your Honor, we have one more thing. Mr. Stetson is scheduled to be here Monday.

THE SPECIAL MASTER: That's fine.

MR. CLEAR: But I have not had a chance to talk to him. So we would be prepared just to put him on the stand Tuesday.

MR. ECHOHAWK: That would be the safest thing.

THE SPECIAL MASTER: Let's see.

MR. CLEAR: Your Honor, one more point. I think, as you recall, Mr. White retained a copy of computer programs because he was going to use -- he said he was going to use them in cross-examination of Dr. Mesghinna, and since his examination is now over, I would ask counsel for the State to return that copy to the Court.

THE SPECIAL MASTER: Why don't you ask him about it Monday morning?

MR. KROB: Your Honor, I can anticipate his answer in that his response to the Court on the record was that he would retain it for preparation of his case in cross-examination, and he has assured the Court already that a file copy will be revealed to no one and he is using it only for the preparation of his case. The impression that the record gives, Mr. White was operating under the impression he would be allowed to retain that one file copy.

MR. CLEAR: I thought the order said return all copies, Your Honor, and I don't see how he can use it in preparation of his case unless he gives it to his expert.

THE SPECIAL MASTER: Let's talk about that when he is here on Monday, and we can discuss that with him.

MR. ECHOHAWK: Is he going to be here Monday?

MR. MERRILL: I'm not sure he will.

Since the Court has ordered that Dr. Mesghinna is under the continuing jurisdiction of the court and we have a right to call Dr. Mesghinna in our case in chief, I think it's only proper that we be allowed to retain this one copy subject to the promises we already made to the Court. So if we decide to call Dr. Mesghinna and ask him further questions about the program, we are allowed to prepare for that.

THE SPECIAL MASTER: That sounds reasonable to me. It is the last copy and he is not Xeroxing it and handing it around.

MR. CLEAR: I realize that. But if it is in the file a few years from now and somebody pulls it out -- I'm not accusing him of anything.

THE SPECIAL MASTER: Gentlemen, we stand adjourned until Monday morning at 9:15 at Room 302, the Capitol Building up the street one block.

(Whereupon the proceedings were
(recessed at 11:45 a.m.

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REPORTERS' CERTIFICATE

State of Wyoming)
: SS
County of Laramie)

We, Merissa Racine and Mary Nelson, Registered Professional Reporters and Notaries Public in and for the First Judicial District, State of Wyoming, hereby certify that we did at the time, date and place, as set forth, report the proceedings had before the Honorable Teno Roncalio, Special Master Presiding, in stenotype; that the foregoing pages, numbered 4968-5057, inclusive, constitute a true, correct and complete transcript of our stenographic notes as reduced to typewritten form under our direction.

We further certify that we are not agents, attorneys or counsel to any of the parties hereto, nor are we interested in the outcome thereof.

Dated this 8th day of May, 1981.

Merissa Racine
MERISSA RACINE
Registered Professional Reporter

Mary Nelson
MARY NELSON
Registered Professional Reporter

MERISSA RACINE - NOTARY PUBLIC
COUNTY OF LARAMIE STATE OF WYOMING
My Commission Expires Mar. 13, 1981

MARY R. NELSON - NOTARY PUBLIC
STATE OF WYOMING COUNTY OF LARAMIE
My Commission Expires March 13, 1983