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WEDNESDAY, DECEMBER 1, 1993, 8:30 A.M.

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MR. DEL PIERO: Ladies and gentlemen, this hearing will come to order.

This is a continuation of the hearing regarding Amendment of the City of Los Angeles' Water Rights Licenses for Diversion of Water From Tributaries to Mono Lake.

Today is the 1st of December. We have days scheduled now through the 22nd?

MR. CANADAY: That's correct.

MR. DEL PIERO: One day that we were anticipating not having available to us was the 13th because it was thought I was going to have to be in San Bernardino. That may still be the case, although the likelihood of that is very, very diminished at this point, and rather than having to go to San Bernardino, we may be capable of getting that matter resolved with a two-hour intermission. It may well be that on the 13th it is possible that we might start like at 11:00 in the morning after I've taken care of that earlier. So we will see how that plays out.

In any event, that day was also noticed for this hearing, so we have ourselves covered there.

When last we left off, Mr. Birmingham, who was on?

MR. BIRMINGHAM: We had just concluded with the testimony of Dr. Wade and Dr. Carson, and we were about to

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call Bruce Kuebler, who is an engineer with the Department of Water and Power, and Andrew Pollak will examine Mr. Kuebler, who is here this morning.

MR. DEL PIERO: Good morning, Mr. Pollak, how are you?

Mr. Kuebler, have you been sworn?

MR. KUEBLER: No.

(At this time all prospective witnesses present were sworn.)

MR. POLLAK: Good morning, Mr. Del Piero and Mr. Brown. You have commented earlier on the food chain for the Audubon attorneys. You have now reached a new trophic level for Los Angeles. (Laughter.)

BRUCE W. KUEBLER

having been sworn, testified as follows:

DIRECT EXAMINATION

by MR. POLLAK:

Q Please state your name and spell it for the record.

A My name is Bruce W. Kuebler, K-U-E-B-L-E-R.

Q By whom are you employed?

A I am employed by the Los Angeles Department of Water and Power. I am Director of Water Quality. I am head of the Water Quality Division.

Q Is LADWP Exhibit Number 69 your testimony in this matter?

A Yes, it is.

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Q And is LADWP Exhibit Number 70 a correct copy of your background in this proceeding?

A Yes.

Q Please summarize your background and how it related to your testimony in this proceeding.

A For the past six years I have been head of the Water Quality Division of the Los Angeles Department of Water and Power. The Water Quality Division is responsible for protecting the water quality we serve to our customers. In that capacity we are responsible for the operation and maintenance of the Los Angeles Aqueduct filtration plants which filter our Los Angeles Aqueduct supply.

We are also responsible for monitoring, sampling, and testing water to be sure it complies with State and federal water quality regulations, and we are also responsible for monitoring, sampling, and testing our open reservoirs to assure compliance with water quality standards.

As I say, I have been in that capacity for six years. Prior to that time I was assistant head of the Water Operating Division. Prior to that I spent 16 years working in the Los Angeles Aqueduct Division on environmental studies regarding the Owens Valley and Mono Basin.

Q What were your duties in the Water Operating Division?

A I was assistant head, responsible for a variety of administrative and operational duties dealing with the

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operation and maintenance and distribution system.

Q Do you have any changes to make in LADWP Exhibit 69, which is your testimony in this matter?

A Yes, I do. On page 103 in Table D, relating to total organic carbon, I believe there is a misprint, a typographical error in the first entry, dated September 25, 1992. That should be 1991.

And I have a second change on page 104 in Paragraph D, titled Optimized Coagulation. The third line from the bottom of that states, "than 2 milligrams per liter of total organic carbon." Change it to a 4. The 2 should be changed to a 4. With that change, then, the last two sentences should be deleted.

Q So, we are striking the last two sentences of that paragraph?

A Yes, and changing the 2 to a 4 milligrams per liter.

Q With that, will you please summarize your testimony?

A My testimony today is directed to the analysis carried out by the Draft EIR on the water quality aspect of reducing and replacing the City of Los Angeles' Mono Basin water supply.

Nearly all of the Draft EIR's alternatives contemplate a reduction in the City's diversions from the Mono Basin.

As the Draft EIR recognizes, shortfalls in the drinking water needs of Los Angeles may be overcome by

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purchases of water from alternate sources. The Draft EIR deliberately didn't evaluate the quality of the water obtained to replace the Mono Basin supply, and inadequately analyzes the impacts on the Los Angeles Aqueduct system of a reduced amount of Mono Basin water reaching the City.

The loss of water from the Mono Basin would adversely affect the drinking water supply for the more than 3 million consumers in Los Angeles. By "adverse," I am referring to a water supply in which the concentration of some significant substances will be higher.

Water from the Mono Basin is the most mineral-free water available in the City's water supply system. This water is typically snow which has not yet been used by any industries, agriculture, or other municipalities. It is the City's best quality source.

Because of its purity, this water can be used to dilute naturally occurring minerals in the Owens River. One of the dissolved minerals which is diluted is arsenic. Arsenic has been designated as a primary contaminant by the U. S. Environmental Protection Agency. We note that the Owens River contains naturally occurring arsenic.

Blending water from the Mono Basin helps to reduce the arsenic concentrations.

As recognized in the Draft EIR, if less water or no water at all is available from the Mono Basin for blending,

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the arsenic concentrations reaching the consumers of Los Angeles will correspondingly increase. However, the Draft EIR underestimates the arsenic concentrations that would be experienced in a prolonged reduction of Mono Basin water.

As shown in Table B of my recent testimony, arsenic concentrations have exceeded by almost 20 micrograms per liter the highest levels projected by the Draft EIR. Although the Los Angeles water supply meets the current arsenic standard of 50 micrograms per liter, the Environmental Protection Agency will soon propose a more stringent arsenic standard, in the range from 20 micrograms per liter to half a microgram per liter.

The best estimates at this time are that the standard would be between 2 and 5 micrograms per liter.

Water from the Mono Basin would help meet the requirements of the new standard regardless of what the actual value is. In fact, if the standard is very low, it may be necessary to use blending, a new treatment plant at Hot Creek, which is a source of most of the arsenic, and additional treatment facilities at the Los Angeles Aqueduct filtration plant.

Turning to the issue of dissolved minerals, as mentioned before, water from the Mono Basin is essentially melted snow. If this water is not available, the department must rely on alternative supplies, most likely from the

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Metropolitan Water District of Southern California. Although Metropolitan Water District water meets the health-based primary drinking water standard, this water contains much

higher levels of dissolved minerals. Water from the State Water Project has nearly ten times more minerals than Mono Basin streams; and water from the Colorado River has nearly 15 times more.

Consumers can taste the difference and can see the difference because of higher residues after evaporation. We believe that consumers often associate taste with the safety of their drinking water, with the perception that if a different taste is produced by high dissolved minerals, then the water is of poor quality and is unsafe to drink.

During the past year, a year in which no water was available from the Mono Basin portions of Los Angeles received water was so high in dissolved minerals that the esthetic-based secondary standard for total dissolved solids was exceeded. As shown in Table C of my written testimony, some consumers in Los Angeles drank water for an entire year which did not meet the EPA secondary standard because of the department's reliance on alternate supplies.

A third water quality item I would like to discuss is a new Environmental Protection Agency's proposed regulations for disinfection by-products or DBPs. DBPs include trihalomethanes, haloascetic acids, and bromate, which are

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discussed in my written testimony as well as other groups of compounds.

DBPs have become important for water suppliers because EPA believes that they may increase the risk of getting cancer.

DBPs are substances formed during common water treatment practices in which some naturally occurring organic material undergoes chemical changes.

Water from Mono Basin contains low concentrations of these materials and very little DBPs are formed.

However, alternate water supplies provided MWD are higher in organic materials and will result in higher DBP formation. The higher organics forced MWD to change its disinfection practices several years ago from free chlorine to a mixture of chlorine and ammonia.

We have seen a dramatic increase in trihalomethane levels in Los Angeles as the percentage of MWD water increases.

In conclusion, I would like to call attention to an assertion on page 3B-34 of the Draft EIR: Los Angeles water supply quality remains relatively unchanged or diminishes insignificantly.

On the contrary, I believe any restrictions placed upon export of water from the Mono Basin, the City's highest quality supply, have adversely affected the quality of water

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served to consumers of Los Angeles.

MR. POLLAK: Thank you, Mr. Cooper. That concludes our direct testimony.

MR. DEL PIERO: Thank you very much. Ms. Cahill.

CROSS EXAMINATION

by MS. CAHILL:

Q Good morning, Mr. Kuebler. I would like to explore a bit of the quality of the water again in the Owens River system. Is it true that Los Angeles uses some water for irrigation on lands owned by Los Angeles Department of Water and Power in the Owens and Long Valleys?

A Yes.

Q And what is the purpose of that irrigation, what type of a crop?

A There's a variety of alfalfa that is irrigated, primarily, and native pastures for grazing.

Q And does some of the water that is used for irrigation return to the Owens River?

A I believe it does, yes.

Q And is there a causative link between the irrigation return flow from pasture and the increase in the nutrients available for aquatic plants and algal growth?

A Probably.

Q Is water quality a concern in the Owens River system aside from the arsenic question?

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A No, it's the TOC levels that would be the main concern in the context of disinfection by-product formation. I think that would be the key.

Q Are there sometimes problems with blue-green algae being present?

A Yes.

Q And what measures do you take to remedy the problems associated with the algae?

A We typically use chemicals. Copper sulphate is the most common to treat our reservoirs and control algae.

Q And do you know how much copper sulphate is applied at Haiwee Reservoir each year?

A Yes, it varies. I would say in historic times it has been around 100,000 pounds a year. I believe last year it was substantially less, more like 10,000 pounds.

Q Would better watershed management tend to improve water quality in this portion of the Owens River?

MR. POLLAK: Objection, ambiguous.

MR. DEL PIERO: Sustained.

MS. CAHILL: Q Are there measure that Los Angeles could take to decrease the nutrient load in the Upper Owens River?

A I suppose. I'm not sure how significant it would be.

Q What type of measures do you have in mind?

A Grazing, maybe a contribution to the extent that that

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occurred and causes significant increase, if you eliminate grazing, maybe.

Q Would that likely reduce the need for chemical treatment in the reservoir?

A I don't know.

MS. CAHILL: Thank you, that is all.

MR. DEL PIERO: Thank you very much. Mr. Dodge or Mr. Flinn. Mr. Dodge.

MR. DODGE: Good morning. Before I ask my few questions, at some point we ought to address the logistics and timing for the Friday visit.

MR. DEL PIERO: We need to do that.

MR. DODGE: You don't want to do that now?

MR. DEL PIERO: Why don't we do it just before the break.

MR. DODGE: Okay.

CROSS-EXAMINATION

by MR. DODGE:

Q Mr. Kuebler, I have just a few questions for you. There is a standard of 50 for arsenic right now; is that right?

A Yes.

Q Give me the units. I've forgotten.

A Micrograms per liter.

Q If you look at Table B in your testimony, at page 100,

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you list 11 dates after diversions were stopped by Judge Finney's order, and I see that out of the eight measurements there is one in excess of 50. Do you see that?

A Yes, I do.

Q Now, was that water sent to the consumers in Los Angeles at 73, or was it treated?

A That water was blended with some water we were taking at the Los Angeles Aqueduct filtration plant, and that water went to the consumers.

Q So, when it went to the consumers, it was less?

A It was less than 50, yes.

Q Now, you also referred to two things in your testimony. One was blending, and the other was treatment. What sorts of treatment are available to reduce arsenic content?

A There are several, depending on the process you have. You could use coagulation by using very heavy, large doses of ferric chloride or alum in conjunction with a filtration process. You can use ion exchange, you can use activated alumina which is similar to dialysis, and reverse osmosis.

Q Then when you go back to Figure 1, which appears to me to show arsenic concentrations for a much broader time frame, that is, 1940 on, am I right there?

A Yes.

Q From 1940 to 1991, I see a lot of -- I counted about

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eight measurements in excess of 50, and again I would ask you the same question, were those sent to the consumers in Los Angeles or were those again blended?

A I believe those were -- I'm not sure.

Q Would it be fair to say that even prior to Judge Finney's order that occasionally water arrived down the aqueduct to Los Angeles which exceeded the 50 micrograms per

liter standard for arsenic?
A Yes.
Q Now, let's stick with Figure 1, and it looks to me like the great bulk of the readings are concentrated between 10 and 30. Do you agree with that?
A Yes, I would.
Q Now, you mentioned the possibility that EPA might lower the standard from 50 to somewhere between a half and 20, with the most likely range being 5 and 2. Now, you would agree with me that basically all these readings on Figure 1 exceed 5; correct?
A Yes.
Q And you also mentioned the possibility that with a new standard, Los Angeles might have to build a new facility at Hot Creek or might have to do additional treatment. Do you recall that testimony?
A Yes, sir.
Q Now, would you agree with me that if the standard goes

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down to 5 or 2, that Los Angeles is going to have to meet that whether or not it receives Mono Basin water?
A Yes.
Q What is the total DWP water demand, approximately?
A Six hundred thousand acre-feet a year.
Q And your testimony, I believe, is that to the extent DWP is unable to receive Mono Basin water, it will look to alternative sources, and you specifically mentioned Metropolitan Water District water; correct?
A Yes.
Q This is the same Metropolitan Water District that serves the great bulk of Southern California; correct?
A Yes.
Q You are talking about receiving extra water from Metropolitan Water District, the same water quality that is sold all throughout Southern California?
A Yes.
Q Now, you mentioned that MWD water meets all health standards. Do you recall that testimony?
A Yes.
Q But you also told us, I believe, that the aesthetic standard was exceeded?
A Yes.
Q That you called a secondary standard. What did you mean by that?

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A It affects the acceptance of the water supply to customers. It is not a health risk, but it's designed for palatability, that we are required to supply pure, wholesome, and potable water under the Health and Safety Code. Aesthetics refers to the potable aspect of that requirement.
Q There's nothing illegal about delivering that water; is there?
A No.
Q It is just a guideline?
A It's a guideline, yes.
MR. DODGE: Thank you. I have no further questions.
MR. DEL PIERO: Thank you very much. Mr. Roos-Collins.
MS. KOEHLER: Cal-Trout has no questions.
MR. DEL PIERO: Ms. Scoonover.
MS. SCOONOVER: We have no questions.
MR. DEL PIERO: Anybody else have questions for the witness besides our staff? Mr. Frink.

EXAMINATION

by MR. FRINK:
Q Mr. Kuebler, were you involved in the preparation of the Department of Water and Power's Mono Lake Management Plan?
A No.
Q Did anyone in the Department of Water and Power ask

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you to evaluate the water quality impact of the Mono Lake Management Plan?
A No.
Q Have you made any comparison of water quality impacts of implementing the Mono Lake Management Plan with the water quality impact of implementing various alternatives identified in the Draft EIR?
A No.
MR. FRINK: I believe that's all the questions I have.

EXAMINATION

by Mr. HERRERA:
Q I just have a couple of questions regarding the continuation of what Ms. Cahill discussed, and that was earlier you mentioned the use of copper sulphate on Haiwee Reservoir. I would like to come up to Crowley Lake. Are they experiencing the same types of algae problems as Haiwee, or do they experience that kind of problem?
A We do experience algae problems at Crowley Reservoir.
Q Is it treated the same way?
A I don't believe so.
Q Is there use of copper sulphate at Crowley Reservoir for algae control?
A I don't believe so.
Q It is an algae problem; is that correct?
A We occasionally have algae problems there, yes.

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Q Do you have any idea what the source of that problem is?
A No.
Q Is there any adjacent land there -- Is there any source of arsenic feeding Crowley, for example?
A Hot Creek is the main source of arsenic in the watershed.
Q Is there any arsenic coming from runoff of irrigated lands or grazing lands?
A I don't know.
MR. HERRERA: That concludes my questions. Thank you.
MR. DEL PIERO: Mr. Canaday.

EXAMINATION

by MR. CANADAY:
Q Good morning, Mr. Kuebler. Do you have any other sources of arsenic in the Owens River water supply that contributes arsenic to the water to the City of Los Angeles?
A The wells that we have in Owens Valley have arsenic in some of them. I don't know the concentrations, but they would have some concentration. I believe it is substantially lower than the contribution we get from Hot Creek.
Q But, nevertheless, there are sources besides Hot Creek that are, in fact, below Crowley Reservoir; is that correct?
A Yes.
Q In your testimony you speak that the loss of water

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from the Mono Basin would reduce the effect of pollution and significantly increase the concentration of all major dissolved minerals in the Owens River. When you speak of loss, are you referring to total loss of Mono Basin water or percentage of Mono Basin water? What did you have in mind there?
A I think reduction in diversion from what we have had historically would result in higher levels of minerals in the remaining part of that watershed.
Q To kind of repeat a question from Mr. Frink, you haven't evaluated the effect of the new Mono Lake alternative proposed by the department which includes a reduction of 50 percent of the previous supply would have on the water quality to the City of Los Angeles?
A No, I haven't.
Q In your testimony. also, you expressed a concern about the safety because of the adverse quality of water that you are getting from MWD. Do you believe that the water from MWD has impacted your ability to meet safety standards to your customers?
A It hasn't impacted it as yet, but it is likely to.
Q In what way?
A As I indicated in my testimony, but as we have purchased more Metropolitan Water District water because of the cutback in the diversion and the drought, we have seen a

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substantial increase in the trihalomethane concentrations in the distribution system, and we are getting much closer to the current standard, and we're getting almost at the new EPA standard of 80 micrograms per liter.
Q What burden is it upon MWD if you purchase water from them under the current standard or future standard for trihalomethane precursors to deliver water to you? Do they have to treat that water before you would receive it?
A Yes, they would.
Q So the burden of treating the water for trihalomethane precursors would be the responsibility of Metropolitan Water

District and not the department?
A It's kind of the responsibility of both of us. They have the responsibility to meet the standard when they deliver to us, and we have the responsibility to meet the standard when we deliver to our customers. Trihalomethanes increase in concentrations as they move through the distribution system, so it's a dynamic situation, that they give the water to us below the standard, and it could increase and exceed the standard if we aren't able to deal with it in our system.
Q How would that happen?
A As we chlorinate the water to control bacterial growth and things like that, the formation of these by-products continues to exist. We have to find ways to minimize that

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growth in the formation, and we have to minimize the purchase of water where it has high levels of precursors.
Q But MWD is not responsible to deliver water to you with reductions of those precursors or potential formation of these?
A They can't eliminate that totally. They have to deliver it to us in a way that meets the standard, and ideally would deliver to us in a way we could meet the standard without additional treatment.
Q You talked in your testimony about the bromoforms. Now, what is the source of bromoforms?
A Bromide, primarily.
Q And that comes from what type of water, fresh water or sea water?
A It can be in fresh water as well as sea water.
Q But the source of it is sea water; is that correct? Salt water or brackish water?
A That's a large source.
Q Prior to diversion of water from the Mono Lake Basin, did water from Hot Creek enter into the aqueduct system?
A Yes, it did.
Q Were there problems with arsenic in the water delivery at that time?
A We have not exceeded the standard to my knowledge.
MR. CANADAY: Thank you. That's all I have.

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MR. DEL PIERO: Mr. Pollak, redirect?
MR. POLLAK: Thank you, Mr. Del Piero.
REDIRECT EXAMINATION
by MR. POLLAK:
Q Mr. Kuebler, Mr. Dodge asked you some questions about the ability of the Los Angeles Department of Water and Power to meet the future arsenic standards. How would the addition of Mono Basin water affect the department's ability to meet those new standards?
MR. DODGE: Objection, ambiguous.
MR. DEL PIERO: Sustained.
MR. POLLAK: Q If there were no reduction in Mono Basin diversions, from these historic diversions, how would that affect the department's ability to meet the improved standard?
A It would give us a lower concentration supply to deal with in developing treatment to meet the new standard.
Q So, your testimony is that any reduction in the arsenic reaching Los Angeles would assist the department in meeting those new, tougher standards?
A Yes.
Q Ms. Cahill and other attorneys asked you questions about irrigation in Inyo and Mono counties. Based on your experience in the Department of Water and Power, what is your opinion on the reaction in Inyo and Mono county if Los

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Angeles DWP proposed to terminate irrigation in the Owens Valley?
A I believe it would be substantially adverse.
Q Why is that?
A Because of the historic practices in the social structure that exists there.
Q Turning to the question of trihalomethanes, you stated in your testimony when Mr. Canaday asked you questions about the amount of organics reaching the City and the formation of trihalomethanes, and in your testimony you stated that water purchased from Metropolitan Water District is higher in trihalomethane precursors, can yield unacceptably high THMs on chlorination. What kind of THM concentrations have you seen in the City's distribution system, and how does that correlate with the use of MWD water?
A In 1988 we were purchasing about 22 percent of our total supply from MWD, and the average concentration of THMs in the City's distribution system was about 25 micrograms per liter.
In 1990, when the percent of the City's supply from MWD increased to 65 percent, the concentration of THMs in the City's distribution system was approximately 60 micrograms per liter. So, it increased substantially in proportion to the percent of Metropolitan Water District water purchased.
Q Do you have any data to support that?

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A Yes, I do.
Q Can you show it to us today?
Mr. Del Piero, we would like to put up an overhead.
MR. DEL PIERO: Please.
MR. POLLAK: I would request to designate the exhibit that Mr. Kuebler is presenting on the overhead next in order. We will provide copies of this to all counsel.
MR. DODGE: I would note that this appears to be part of DWP's rebuttal case rather than redirect. If it is only going to take a couple of minutes, I have no objection.
A This shows what I described. The line here indicates the four quarter running average of THMs in the City's distribution system, and the open bars on the bottom here show the percentage of MWD water that makes up the City's total supply.
As I indicated, in 1988, when we were at roughly 22 percent of Metropolitan purchases, the level was about 25 micrograms per liter. It increased to a maximum of about 60 micrograms when we had 65 percent MWD water and has remained high and gone up a little bit in the last year.
MR. DEL PIERO: Thank you.
MR. POLLAK: Q Thank you, Mr. Kuebler. One last question: You might want to stay up there to explain this. Are the effects of the THM formation limited to Los Angeles Aqueduct filtration plant?

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A No, they are not, for two reasons. The City of Los Angeles is somewhat unique in that we have open distribution reservoirs, reservoirs that have received treated water that are open to the air. We have algae problems in those reservoirs like we do in Haiwee Reservoir, and we need to use substantial amounts of chlorine to control algae in those open reservoirs. That adds to the THMs throughout the distribution system. In fact, that's one of the reasons that in the last year or so we have seen the vast increase in THM levels because of the need to use more chlorine to control the species of algae that we found as our percent of Metropolitan water went up. It is resistant to copper sulphate treatment, and we have to use chlorine, and that raises the level.
The second reason is that we have a different disinfectant, as I stated in my testimony, than Metropolitan Water District does. They use chloramines. We use chlorine.
If we take a treated water supply from them, it has chloramines in it. If you mix chloramine with chlorine in our distribution system, the two disinfectants tend to cancel each other out unless you add a lot of chlorine to burn up the chloramine.
By doing that, you are adding to the trihalomethane formation of disinfection by-products, so we have a more difficult situation because of the unique characteristics of

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the City's distribution system.
Q And any additional increment of Mono Basin water would allow the City to purchase an associated smaller amount of MWD replacement water. isn't that correct?
A Yes.
MR. POLLAK: Thank you, Mr. Kuebler.
Could we have an exhibit number for this?
MR. SMITH: LADWP 36.
MR. DEL PIERO: Ms. Cahill.
RECROSS EXAMINATION
by MS. CAHILL:
Q I believe the Board staff asked you about the source of arsenic that came into the Owens River. Are you aware of any geothermal development on tributaries to the Owens River?
A No.

Q Is it possible that geothermal development on tributaries to the Owens River will result in a reduction in the amount of arsenic which reaches the Owens River?
A I don't now.
Q And one last question, you testified, I believe, that it was 100,000 pounds of copper sulphate that was used at Haiwee?
A Yes.
Q That would be 50 tons a year?
A Yes.

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Q And what happens to that copper sulphate?
A Well, it is dissolved in the water and flows down to the City.
Q And does some precipitate to the bottom of the reservoir?
A Some would probably find its way to the bottom, yes.
MS. CAHILL: Thank you.
MR. DEL PIERO: Mr. Dodge.

RECROSS EXAMINATION

by MR. DODGE:
Q Can you read that chart, sir?
A Yes, I can.
Q You were asked questions by Mr. Frink, and I believe others, about water quality impacts vis-a-vis the proposed L. A. Management Plan. Now, let me just ask you to assume these numbers are right. I won't ask you to vouch for the numbers, but assume that under the L. A. Management Plan there's going to be exports from the Mono Basin up 45,780 acre-feet a year; under the 6390 alternative, 37,000; under the 6410 alternative, 22,000.
So, you see the difference in the one case is 8700 and in the second case is 23,700.
Now, with those numbers in mind, do you have any information that you can give to Mr. Frink relating to his question about the impact of the Los Angeles plan vis-a-vis

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the alternative plans?
A No.
Q You can't tell us what the loss of 8700 acre-feet of water, Mono Basin water, would have on the health matters you have been discussing?
A I haven't evaluated that.
Q You mentioned, I think, that the total demand in Los Angeles is typically around 600,000 acre-feet; is that right?
A Yes.
Q And historically the aqueduct delivered what quantity of water to Los Angeles?
A I believe it's 90,000, somewhere in that range. I don't have a precise figure.
Q That includes Mono Basin water?
A Excuse me, that's Mono Basin. Would you repeat your question?
Q The 90,000 referred to Mono Basin water; correct?
A Yes.
Q I want you to tell me historically what the total aqueduct delivery to Los Angeles is.
A I guess it depends on the base period you're using. I am not sure I have the exact figure at this time, but it is in the range of 440,000 acre-feet, or something like that.
Q 440,000 acre-feet a year?
A Yes.

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Q And again, let's take that 440,000 acre-feet a year, can you tell the Board anything about what the impact would be of losing 8700 acre-feet of Mono Basin water?
A The thing that strikes me about that is that represents an equilibrium condition. Once you reach some different lake elevation than there is now, and there's a significant period of time to reach that, and the water quality impacts during that time to reach the equilibrium, I believe, will be significant, as I stated in my testimony.
Q And once the equilibrium is reached, can you answer the question?
A Once the equilibrium is reached, I think the difference would be very small.
Q That would also be true on the 23,700; wouldn't it?
A It would be a little larger, but still would be less significant.
MR. DODGE: Thank you, no more questions.
MR. DEL PIERO: Ms. Koehler.
MS. KOEHLER: No questions.
MR. DEL PIERO: Ms. Scoonover.
MS. SCOONOVER: No questions.
MR. DEL PIERO: Anyone else? Mr. Frink.

EXAMINATION

by MR. FRINK:
Q Mr. Kuebler, I have just three questions, I believe.

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When do you expect the new EPA standard for arsenic to go into effect?
A Probably 1998.
Q In response to a question from Mr. Dodge earlier, I believe you stated that with or without the water from the Mono Basin, it may be necessary for the Department of Water and Power to construct a chemical treatment plant; is that correct?
A Yes.
Q Is the City presently planning to construct such a treatment plant for arsenic?
A Yes, we are doing preliminary studies to assess the feasibility of different options so we will be able to move quickly and comply with the regulation.
MR. FRINK: I believe that's all I have.
MR. DEL PIERO: Mr. Herrera.

EXAMINATION

by MR. HERRERA:
Q I would like to discuss a little bit about arsenic concentrations between Mono Basin and the Upper Owens. Does the Mono Basin water that's exported into the Owens have arsenic in it?
A I don't know precisely. I think it probably has some. I don't know the exact concentration. though-
Q But it does contribute some arsenic to the Owens

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River?
A It could. I don't know. If there is some, it would be a very low level, and I don't know what that is.
Q What is the effect of, let's say, a large reservoir like Crowley Lake upon the arsenic that's being contributed by the river? Does the lake filter that, or does it reduce arsenic? Is it tied up in the algae or sediments, or does that occur?
A It could. I don't know. I wouldn't be able to quantify that at this point.
Q The reason I asked that question, in Table A, presented in Section 6, page 98, it shows the various concentrations of arsenic coming in from various contributions into Crowley, and it shows an outlet amount somewhat less than the 18 that is shown here, so I am assuming there's some loss in Crowley, and I'm curious as to how that's occurring.
A If it occurs, I think I've heard some speculation that the algae may take up arsenic. I don't know. I have not seen any studies that quantify that, and I don't know how significant it is. I think the biggest effect of Crowley is the high dilution effect from other waters that have low concentrations like the Mono Basin supply and other tributaries to Crowley.
Q What percentage do you think Mono Basin has been

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contributing to Lake Crowley in comparison to the other several streams that are contributing to Crowley as well?
A I don't know what the hydrology is of Long Valley, and I don't know the answer.
Q What I'm getting at, can you give me some idea what kind of dilution factor is coming from the Mono Basin?
A It would be my judgment that it would be very significant, probably 50 percent, something like that, in that ball park.
Q So, in other words, this very low concentration of arsenic from Mono Basin into Crowley, the dilution factor is 50 percent?
A At Crowley Lake that's a rough estimate. I would have to check the hydrology to see what the tributary streams are to Crowley and to compare that with the Mono Basin.
Q So, in your analysis, you didn't know what you were looking at as far as the number goes coming from Mono to Crowley Lake; is that correct?
A I didn't look at that precisely, no.

MR. HERRERA: That concludes my questions.
MR. DEL PIERO: Mr. Canaday.
EXAMINATION
by MR. CANADAY:
Q Could you put up your figure that you used previously for THMs, please. I think that's Figure 2.

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What is the current EPA standard for THMs?
A 100 micrograms per liter.
Q What is the highest number that you have there?
A 73.
Q Now, have you done the analysis to quantify that it's linear in trihalomethane precursors or trihalomethane in your water supply are directly related to MWD sources?
A I think the graph indicates -- We know that MWD supplies have higher total organic carbon levels which are an indication of precursors for trihalomethane. And this data indicates there is a correlation between the two of them. Whether it is linear or some other function, I'm not sure, but there is a correlation between the two, I believe.
Q Well. as you increase purchases from MWD, you have also probably increased other supplies that are available to Los Angeles DWP prior to buying that water, is that correct -- groundwater pumping?
A No.
Q So, the total effect then is from MWD?
A I believe it is.
Q But again, you are under the standards?
A We haven't exceeded the standards, right.
Q Are you aware of EPA proposing to lower the THM standard?
A Yes, I am. They are going to.

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Q Do you know what that would be?
A The first stage of the standard would have a limitation of 80 micrograms per liter. They are also going to regulate a new group of compounds, haloascetic acid at 60 micrograms per liter.
MR. CANADAY: That's all I have.
MR. DEL PIERO: Mr. Smith.
EXAMINATION
by MR. SMITH:
Q Following up on the question Mr. Canaday asked, would you please provide the Board with a regression analysis of that figure, linear analysis, statistical analysis, so we can have that. In other words, could you please provide us with the R squared on that, because I would like to personally see what the analysis shows?
A We can look into it.
MR. SMITH: Thank you.
MR. DEL PIERO: Is that a yes or no?
A Yes.
MR. DEL PIERO: Any other questions? Mr. Canaday.
EXAMINATION
by MR. CANADAY:
Q One follow-up question on a line of inquiry by Mr. Dodge. We established that you had not looked or analyzed the impact to Los Angeles' ability to maintain water quality

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based on the new LADWP Management Plan; is that correct?
A Yes.
Q And you said that the amount of water presently delivered to customers in your service area is about 600,000 acre-feet?
A Yes -- Don't rely on my number. I think there are people here that have a more precise answer.
Q That's an approximation?
A Yes.
Q And let's assume that the numbers Mr. Dodge had on his chart are correct, and the number he had for the difference between the LADWP alternative, and that's what we call it, and the 6390 alternative, that the difference in acre-feet of reduced supply to the City of Los Angeles was 8900 acre-feet. That constitutes a little over 1 percent of the Los Angeles supply. Do you have the sophistication to determine the impact of that 1 percent reduction as opposed to the 45,000 acre-foot reduction to the City of Los Angeles, or could you quantify that difference in the impact to water quality?
A I think it would be difficult to.
MR. CANADAY: Thank you.
MR. DEL PIERO: Okay. Ms. Forster.
EXAMINATION
by MS. FORSTER:
Q I have a couple of questions that I want some

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clarification on. When you asked about irrigation practices and what the impact would be if you reduced or eliminated irrigation, what did you mean about it would have an impact on the social structure?
A I think that was in reference to cattle grazing and that the historic cultural environment of Owens Valley has been grazing. That's part of the social fabric in the area, and there would be some strong negative reactions to making a change like that.
Q The other question I have, and it's been hard getting down to the basics, and one question I have is, did L. A. buy water from Metropolitan Water District at 676 dollars an acre-foot -- Where does that 676 dollars entered on your chart come from?
MR. BIRMINGHAM: I believe there is a misunderstanding. That is not a figure we have produced. I think that is a figure the Mono Lake Committee produced. That is not a figure on our charts.
MS. FORSTER: We see it a lot, and I just wanted to know.
Q All right, then, from your perspective, what do you pay Metropolitan Water District when you pay for water from MWD? What is your cost per acre-foot? You can tell me treated and untreated.
A I don't have the figure. I wonder if that question

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could be referred to Mr. Gewe when he gets up. I used to know those numbers, but I have not been that directly involved with that side of the business.
Q Maybe my other questions are for him, too, but I'm going to present them now. You have no idea of what the contributions from Mono to Crowley Lake is, the percent? Don't you know how much water you get from everyplace?
A People know that. I don't know that because I am in Water Quality, and they are involved with the Aqueduct Division. If you asked me that ten years ago, I could have given you a precise answer.
Q I forgot you are with Water Quality. Then I won't ask you this, but I will ask you a water quality question. In your testimony you talk about the most cost effective way of taking care of arsenic would be to build, I'm trying to find it here, to construct and operate a chemical treatment plant in Owens Valley, possibly near the confluence of Hot Creek. It is hard to build a treatment plant, and I understand that. You might get some opposition. Why would you have to build a treatment plant there?
In my experience in water quality, I would think that people looking to the future and the requirements under the Safe Drinking Water Act would be looking at a final end of the pipe treatment process because of all the different problems that happen, like you talk about your own system,

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how you pick up THMs -- so is it conceivable that you wouldn't have to build a plant there, that you could do one mega treatment plant to meet all the new upcoming standards?
A That's a possibility. We are looking into that. The advantage of treating it at the source is you are dealing with a small quantity of water compared to what you would be dealing with at the end of the pipe at the filtration plant. It would be economically much more advantageous to do it that way because you are dealing with a small flow.
It's possible that we may be able to do it at the Los Angeles filtration plant, but that plant doesn't lend itself to the addition of very large doses of ferric chloride, for example, because it is a direct filtration plant. Doesn't have sedimentation like a conventional plant does. If you add large quantities of ferric chloride, which we do already now, you would have to increase it. Instead of one milligram per liter that we might be using now, we might have to increase it to 20 or 30. That would break up the floc that we form to try to get the particles to stick together, so when we push it through the filter it sticks together and doesn't break through.
If you add that much ferric chloride, it weakens the floc, and it tends to break through, and so we would have to,

in effect, downgrade the capacity of the filtration plant, if it was even feasible to do, and that's the kind of thing we

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are looking into today to evaluate our options.
Q Are you doing a major overhaul on your L. A. plant?
A No.
Q How old is your plant?
A Seven years last Friday.
MS. FORSTER: That's all.
MR. DEL PIERO: Mr. Brown.
EXAMINATION
by MR. BROWN:
Q On Figure 2 up here, when there's about a 40 percent drop in THMs with a slight increase in MWD water. Why is that drop in there?
A Excuse me, that occurred when we put our L. A. Aqueduct filtration plant on line in late 1986. The ozone we use at the filtration plant eliminates some of the organic precursors in our water supply. It has a beneficial effect on reducing the formation of THMs, so when we put that plant in operation and we are taking out Mono-Owens Valley supply, we are able to reduce the precursor formation through the ozonation. That is why it went down.
Q Are you still using ozone?
A We are still using ozone, yes.
Q Has there been much consideration to using the same kind of disinfectant as MWD does to reduce the THM fallout?
A Yes. there has been, but we haven't done it because we

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have open reservoirs, as I indicated, and we are concerned that using chloramines, if they got into the reservoir, they were bringing, in effect, some ammonia or nitrate in with them, and that would stimulate more algal growth in the reservoirs which would mean we would have to use more chlorine to control them.
Q How much reservoir capacity do you have -- Is that for peaking or is that just for storage or daily peaking?
A It's a combination of peaking and long-term emergency storage.
Q Approximately what is the capacity? Do you know?
A In the City I think we probably have 40,000 acre-feet.
Q Is there consideration to cover those reservoirs?
A We are in the process. We had started a program to do that in 1988, and we are focusing our attention right now on adding an infiltration plant to comply with the new surface water treatment role, but we do have plans to make improvements on the open reservoirs as well as including covering, yes.
Q Do you retreat the water when it comes out of the reservoirs?
A We don't currently.
Q You are probably going to have to do that if you don't cover them?
A Yes.

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Q But if you cover them, you would not have that expense of treating them in the near future which would be required by federal law?
A The reservoirs that we are having to treat under the federal law, the surface water treatment rule, are too large to consider covering. It is impractical both technically and, I think, politically, and that's why we are proposing to build a filtration plant for those.
Q So, you have some reservoirs that are small enough that you could cover them, and some are not?
A Yes.
Q If you covered the reservoirs, then you could reduce your disinfectant --
A Yes.
Q -- capability, and that would help you with your THMs?
A Yes, it would.
MR. BROWN: That's all, Mr. Chairman.
EXAMINATION
by MR. DEL PIERO
Q I want to follow up on one question. Was not L. A. Water and Power supposed to cover the reservoirs a couple of years ago?
A We did in 1989, yes.
Q And was it not a decision to not do that on the part of the mayor or the City Council that chose not to do that?

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A It was not a decision to not do it, it was the City Council that requested we do a program impact report on the whole project prior to proceeding with specific projects.
Q And was that because of general public objection to the covering of the reservoirs?
A Yes.
Q And that is because of the loss of the aesthetic value, the view of the water?
A Yes.
Q So, in order to accommodate the desire to maintain a view on the part of people located in the proximity of the reservoir, L. A. Water and Power is now considering alternate means of treating; isn't that true?
A Well, for those reservoirs, as I said, that it is feasible to cover, we are still considering that.
Q Feasible technically or feasible politically?
A Both.
Q I want to talk about technically. I used to be a politician. Are there any of your reservoirs technically impossible to cover?
A Yes.
Q Which one?
A I would say Encino Reservoir, Stone Canyon Reservoir, Hollywood Reservoir, and Lower Hollywood Reservoir.
Q Was there another plant?

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A No.
Q At the lower one?
A No.
Q And of those three, what percentage of the 40,000 in your emergency storage, or peaking storage, what percentage of those two do those three reservoirs represent?
A It is probably 80 percent.
Q That's pretty high.
A Well, let's see, 60 percent of it.
Q So, 40 percent theoretically could be covered?
A Technically, yes, possibly, yes.
Q Are any of them covered?
A We do have some covered reservoirs, yes.
Q Are they the new ones?
A Some of the newer ones.
Q The ones that have recently been built so there were no established aesthetic values?
A No. The ones we have covered have been more isolated where the issues of aesthetics hasn't been a significant issue.
MR. DEL PIERO: Ms. Forster.
EXAMINATION CONTINUED
by MS. FORSTER:
Q Just doing kind of a playback of my old tapes on your water treatment plant. Your seven-year-old water treatment

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plant uses ozonation. is that right?
A Yes.
Q And the problems that you are experiencing of THMs coming from MWD's water where they use chloramines, so you ozonate, and then because of the MWD water contribution into your water system, you have to dechlorinate, is that what you're saying?
A I think you might be mixing two aspects. One is we can buy MWD water untreated, which we do a lot of. We treat at our filtration plant using the ozone, and then we chlorinate it afterward. But the water we get from MWD at our treatment plant has higher total inorganic carbon levels than our aqueduct does. Therefore, we have more formation of by-products as the water is chlorinated and goes to the customers in the distribution system.
Another option for us is to buy water already treated by MWD at connections throughout the City. In that case we are taking the chloraminated supply into our chlorinated supply, and that is where we have to bring it out by adding more chlorine, which again increases the formation of disinfection by-products.
So, if we take, for example, water at Eagle Rock Reservoir from MWD, we add a lot of chlorine to bring out the chloramines that were in there and reestablish a chlorine residual so it is compatible with the rest of the system.

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Q MWD has been doing a lot of research. Are they going

to ozonate their water also? As you move into the future, aren't your water treatment protocols going to be more similar than dissimilar as you all try to meet the standard?
A I believe that's true, yes. They are considering adding ozone, retrofitting their existing filtration plants with ozone or a combination of ozone and hydrogen peroxide, which we call peroxone.
Q I know where I live, we are at the end of the system, and we have to dechlorinate, too. I don't think it is unusual for people in Southern California to buy MWD water, and depending on how long the distribution system from the reservoir or treatment plant to where they are, they have to chlorinate, so it's not an unusual event. Thank you.
MR. DEL PIERO: Thank you very much, sir. Mr. Birmingham.
MR. BIRMINGHAM: Would it be possible to take a short recess while we have the next witness come up and arrange his charts? Part of the reason I would like to do that, I want to talk to Mr. Hasencamp about coming on the panel with Mr. Gewe because I think a lot of Ms. Forster's questions can be answered by both of them.
MR. DEL PIERO: Mr. Dodge, you raised the issue of logistical considerations in terms of Friday's activities at Mono Lake. Do you want to tell me what you are talking

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about? I understand somebody may be chartering an airplane. Do you want to wait until after --
MR. DODGE: No, I'm ready to talk. I just wanted to let you finish --
MR. DEL PIERO: I haven't had a chance to talk about it --
MR. DODGE: I'll wait.
MR. DEL PIERO: Who has a problem with starting at 8:00 o'clock on Friday morning? Mr. Birmingham.
MR. BIRMINGHAM: No problem.
MR. DODGE: I personally don't have a problem. I don't know whether the witnesses will have a problem.
MR. DEL PIERO: We were noticed for 9:00 o'clock. I would like to begin at 8:00 o'clock if we can get concurrence from everybody.
MR. DODGE: The problem is just a logistical problem. We had planned to fly up Friday morning and go to the hearing. I don't think anyone is too anxious to try to do that in the dark. Lee Vining has a strip there, but it's not much of an airport. I had hoped that we could alleviate this problem and start at 9:00 and have you ride back to Sacramento or wherever in the charter plane, and that would take care of your speaking problem.
MR. DEL PIERO: What time are you anticipating coming back because it gets dark over there at 4:35, 5:00 o'clock.

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MR. DODGE: I'm not particularly concerned about taking off in the dark. I think you can do that, or we could do Mammoth for that matter. The beauty of that proposal is that we are not up against the fixed deadline in terms of when we have to finish with these witnesses, and if someone is in the middle of cross-examination, he or she can finish it.
MR. DEL PIERO: Who's chartering the plane?
MR. DODGE: Ms. Cahill was organizing that --
MR. DEL PIERO: Are you chartering it, or is it a Department of Fish and Game plane?
MS. CAHILL: No, it's not Department of Fish and Game.
MR. DODGE: Roos-Collins and I were planning to go along. That leaves, and if you were going to come back with us, of course, we would invite Mr. Birmingham or his delegate to come along.
MR. BIRMINGHAM: We were going to drive up on Thursday afternoon and come back --
MR. DEL PIERO: You are driving?
MR. BIRMINGHAM: Driving.
MR. DEL PIERO: What, three of you or four of you?
MR. BIRMINGHAM: There will be four. Mr. Downey, Mr. Hasencamp, and Ms. Goldsmith, and myself.
MR. DEL PIERO: So you're going to drive up Thursday and drive back --

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MR. BIRMINGHAM: Friday night or Saturday morning.
MR. DEL PIERO: Were you flying out of the Bay Area, or will you be here in Sacramento and flying out of Sacramento?
MR. DODGE: Our plan was to fly out of Sacramento. Again, as I indicated, if it would help your scheduling to come back to Oakland, I think we could fly out of Oakland and back to Oakland.
MR. DEL PIERO: Let me point something out. We are going to break no later than 2:00 o'clock on Thursday, so you might want to note that down. On Thursday we are going to be out of this room at one minute to 2:00 because our staff is planning on driving a van, and, frankly, I was planning on going with them over the hill, so we could get over the hill by 4:00 or 4:30, and we aren't going to be in Lee Vining, but at least we will be over the hill on the back side of the Sierras before it gets dark, and I was hoping to accommodate everybody else with the same driving considerations.
Now, my problem is getting back. It's not getting there. It's getting back that is difficult for me. How many seats are there on the airplane?
MR. DODGE: There are nine passenger seats.
MR. DEL PIERO: How many people are planning on going?
MR. DODGE: Right now it's either five or six, so there would be room again for you and a DWP representative on the

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way back.
MR. DEL PIERO: The only consideration I have got is I was planning on taking my son along.
MR. DODGE: There would be room for him, too.
MR. DEL PIERO: Let's take a break and figure this out, because I'm somewhat, in all candor unless someone from the DWP is willing to go along on that flight, I'm somewhat reluctant to go with only certain parties being present.
MR. BIRMINGHAM: I don't want to deprive your son of the opportunity to go up, and the Department of Water and Power has no objection if the hearing officer wants to fly back for scheduling reasons. We have no objection to that, and I know opposing counsel very well, and they are not going to do anything inappropriate, if that's a concern. We have no concern about it.
MR. DEL PIERO: Let's take a break now, and I will make a decision. We will be back in ten minutes.
(Recess.)
MR. DEL PIERO: Ladies and gentlemen, this hearing will again come to order. I don't have an answer yet for you, Mr. Dodge. We are trying to figure out what the latest connection from Sacramento to my place is, so my secretary is working with the airways, and I hope they will have an answer in the next hour or so.
Mr. Birmingham.

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MR. BIRMINGHAM: Thank you very much, Mr. Del Piero. The Los Angeles Department of Water and Power would like to call Gerald Gewe and William J. Hasencamp. Mr. Gewe and Mr. Hasencamp are both engineers in the Department of Water and Power. Mr. Hasencamp will be a member of a panel with Michael Deas later this afternoon.
With the concurrence of my opposing counsel, I will put Mr. Hasencamp on with Mr. Gewe, not to present his testimony at this time, but to help to answer any questions about water supply and hydrology that the members of the Board might have.
MR. DEL PIERO: Great. Both of you have been sworn?
MR. HASENCAMP: Yes.
MR. GEWE: Yes.

WILLIAM J. HASENCAMP

having been sworn, testified as follows:

DIRECT EXAMINATION

by MR. BIRMINGHAM:
Q First I will start with Mr. Hasencamp. Will you state your full name and spell your last name for the record.
A My name is William J. Hasencamp, H-A-S-E-N-C-A-M-P.
Q Mr. Hasencamp, by whom are you employed?
A Los Angeles Department of Water and Power.
Q What is your responsibility in your current position with the Department of Water and Power?

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A I am a hydrologist with the Department of Water and Power, and I supervise the runoff forecasting, report development, and the development of the L. A. Aqueduct simulation model, and I forecast the water supply for the City of Los Angeles through the L. A. Aqueduct.

GERALD GEWE
having been sworn, testified as follows:
DIRECT EXAMINATION
by MR. BIRMINGHAM:
Q Mr. Gewe, would you please state your full name and spell your last name for the record.
A My name is Gerald Gewe, G-E-W-E.
Q Mr. Gewe, by whom are you employed?
A I am employed by the City of Los Angeles Department of Water and Power.
Q And Mr. Gewe, LADWP Exhibit 65 is entitled, Direct Testimony of Gerald Gewe. Is LADWP 65 your written testimony in these proceedings?
A Yes, it is.
Q LADWP Exhibit 66 is a document entitled, Resume of Gerald Gewe. Does that document correctly state your education and work experience?
A Yes, it does.
Q LADWP Exhibit 67 is a document entitled, City of Los Angeles Department of Water and Power Urban Water Management

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Plan, dated March 1991. Did you rely on this document in preparing your written testimony?
A Yes. I did.
Q And LADWP Exhibit 68 is a document entitled, Annual Report of the Board of Water Commissioners of the Domestic Waterworks System of the City of Los Angeles for the Fiscal Year Ending November 30, 1902. Did you rely on LADWP Exhibit 38 in preparing your written testimony?
A Yes, I did.
Q Would you briefly summarize your education and work experience?
A Certainly. I am a General Engineering Manager with the City. I have a Bachelor of Science degree from Cal Poly University at Pomona, a Master of Science degree in Civil Engineering with emphasis in Hydrology from the University of Southern California.
I started out with the City's Department of Public Works. In 1973 I moved to the Department of Water and Power. Within the Department of Water and Power I have had responsibilities in distribution system design, was responsible for Aqueduct operations in the late 70s and early 80s. I was involved in the Environmental Impact Report dealing with groundwater basins in the late 70s, moved to the Water Operating Division responsible for construction of facilities within the City for distributing water, and in

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1991 accepted the position of Engineer of Water Resources Planning, responsible for the City's future supplies and the water conservation and water reclamation programs, and that's my current position.
Q Would you briefly provide an oral summary of LADWP Exhibit 65, the direct testimony of Gerald Gewe?
A I would like to give you a brief background on how the City approaches its water supply planning and then emphasize the City's water conservation and water reclamation programs and how they fit into the general water supply planning within the City of Los Angeles.
The City of Los Angeles has three major sources of water available to it. The first and preferred source is the Owens Valley or L. A. Aqueduct system. This is the preferred source because it has the lowest incremental cost in terms of getting water to the City of Los Angeles. Because the facilities are fixed and because it requires people to do every job along the way, if we're going to bring any water at all, it is almost a zero incremental cost. There's a small amount of power, and there's some chemicals involved in operating the aqueduct system. Other than that, if we bring any water at all, the costs are the same.
Our second major source of supply is the groundwater basin locally in Los Angeles. This supply has an incremental cost of between 92 dollars and 165 dollars an acre-foot,

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depending on how much water we pump in a given year largely.
This supply is our second choice, but in choosing that supply we look beyond the costs and look at the longer-term picture.
Because our groundwater basin is a large reservoir, we choose in wet years traditionally to underpump the basin, store water for the future, and in dry years we will overpump the safe yield of the basin to meet the needs when surface water supplies are not available. So we use it conjunctively.
We look at the cost, but we also look at the long-term benefits of operating within the parameters of the groundwater storage capabilities.
Once we determine the supply available from the aqueduct system and then how much we are going to take from our groundwater basin, we then approach the wholesaler, Metropolitan Water District of Southern California, for the remainder of our supply of water for a given period of time.
And if our supplies change, we will make changes in the orders to the wholesaler.
The Metropolitan Water District of Southern California, in turn, has two major sources of supply, and they make the choices as to which source we receive in Los Angeles. The first source is the Colorado River Aqueduct, and the second source is the State Water Project.

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Now, physically, much of the water will come to us from the State Water Project because of the geographic distribution. There is no way of getting Colorado River water into the northern part of our system hydraulically. So in the northern part of the system we are dependent upon State Water Project water. In other areas of the City we can get a blend or get Colorado River exclusively.
The City has historically focused on reducing unnecessary demands from active water conservation programs, and is adding water recycling to its supply sources.
While the costs for recycled water vary considerably depending on the type of use and the distance between source and the user, these projects tend to be more expensive than other current supply sources.
As we approach our supply planning, at the moment we have established a limit of about 750 dollars an acre-foot as to what we're willing to spend in the near future on water reclamation programs.
This contrasts with our Aqueduct supplies which historically cost us in the neighborhood of 250 dollars to 300 dollars an acre-foot average, although again a very low incremental cost, and the groundwater supplies at somewhere around 150 dollars an acre-foot, so it is a considerably more expensive source, but we're looking in the future to provide reliability to us.

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Water conservation has been a keystone in Los Angeles water supply planning since the earliest days. The first water meter in Los Angeles was installed at a winery in 1898. This marked the beginning of a commitment to water conservation.
This philosophy continued and resulted in full metering of the water system by 1927 and continues to be a strategic principle underlying our operations as demonstrated by the prominence played in water conservation in our water system's strategic plan which was issued in 1991.
In 1976, in response to the most severe drought of the century, the Department of Water and Power dramatically expanded its water conservation programs. Our goal was to assist our customers in using water more efficiently and to reduce the impact of mandatory rationing.
Our programs at that time focused mainly on changing customer behavior and primarily on the residential water users since they used about two-thirds of our water supply.
We issued flow restrictors which could be installed behind the shower head. We issued toilet displacement devices that would reduce the amount of water used in flushing, and developed extensive educational efforts to work with our customers in meeting the emergencies.
At that point in time we needed a 10 percent reduction in water demand, and our customers responded and actually

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generated about a 25 percent conservation level during 1976-77.
In addition to the residential, we also did target our business community. That involved educating them on water conservation measures and instituted a series of recognition programs whereby we gave positive encouragement to those businesses, those industries that were using water effectively and set them up as a showcase for other customers to follow.

During the winter of 1977-78, we had extensive rainfall which brought the drought to an immediate end, and with that end, Los Angeles, like most of the water agencies in California, reduced our short-term conservation effort. However, we realized that there was not going to be an inexhaustible supply of water, and droughts could come again, so we continued to work on the long-term efforts, particularly working with the business community and customer general education through the school programs and through some of our other programs of information encouraging the efficient use of water, but no longer were involved actively in hardware-type distribution.

And at that point in time the demands returned very rapidly to more normal levels.

I would like to have you look at, whatever exhibit it is, called Figure 1, which is out of my written testimony.

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This chart is actually taken from our Urban Water Management Plan prepared in 1991 and shows the historic use of water. Again, you see fairly substantial fluctuations from year to year, largely dependent on weather.

Now, here is the drought of 1976-77. We went into mandatory rationing and obviously reduced supplies from a mean of somewhere up in this range down to the low point here of roughly 500,000 acre-feet, a substantial drop as a result of the fact we did not have the water supply.

However, with the abundant rainfall, the customer patterns rapidly returned to pretty much the predrought levels and then, as growth in Los Angeles continued, the pattern continued to rise.

In the 1985-86 time frame, all of a sudden the weather turned warm and dry, and our demands rose probably faster than normal growth, partially in response to the warm weather.

And as everyone is familiar, in 1990 in Southern California, we first started looking at the impact of the drought. It had been around for a number of years, but because of our storage, we had adequate water, nobody knew there was a drought in Southern California. In Northern California they had been feeling it, so in the spring of 1990, the City of Los Angeles began to put a heavy stress on water conservation, public education, so on and so forth, and

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we saw a dramatic reduction in the use of water in response to both the shortage and the efforts we used in following that.

In the late 1980s we once again increased the intensity of our conservation programs. In 1990, as the effects of the drought became more severe, the Department of Water and Power initiated an extensive public education effort, including spending 2.5 million dollars on television and radio advertising.

We were out ahead of anybody else in Southern California in promoting the fact that we need to use water efficiently to avoid greater problems in the future.

Realizing that water supply shortages were likely to be a continuing problem, we placed our effort on long-term measures as well as the short-term educational effect.

For example, in 1977, we sent our customers a flow restrictor, a little washer that went under the existing shower head, costing us a nickle apiece. Mailing was more than the cost of the device. However, in 1990, actually a little earlier, in 1988, but in 1990 we furnished our customers with a complete shower head, so it will be there and be permanent.

In the 1970s we furnished a plastic bag to our customers to put in. When the drought was gone, that plastic bag disappeared very rapidly.

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In 1990, we encouraged our customers to replace the entire toilet with an ultra low flush toilet that would last permanently, making a savings a permanent harvest in terms of reduced demand that will continue long after the drought is over.

In terms of our business customers, again we had all of the types of programs, the education programs, we developed a committee of business people to work with us on developing conservation programs. We did audits of our customers, but we also came up with a program of providing cash rebates for business to change the hardware. Our technical assistance program to date has issued 100,000 dollars to customers helping offset the cost of installing measures that will permanently reduce their depth of water.

As a result of these programs, both the broad base that we covered, the penetration of these, during the drought we saw conservation levels of up to 30 percent, and today it is still yielding us conservation levels in excess of 20 percent throughout this entire summer.

I would like to put the second exhibit up.

MR. BIRMINGHAM: This is Figure 2 from LADWP Exhibit 65.

A This chart presents the results of our conservation efforts beginning in the first part of 1990 when Mayor Bradley first issued his call to the citizens to voluntarily

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conserve water. During that period, when all the attention was there, our public advertising started, we received levels between 12 and 18 percent that lasted through the summer.

However, as we got into the next winter, the levels dropped down substantially, indicating that most of the effort actually took place in people reducing their amount of water outdoors, and entering the winter, of course, you are not watering outdoors, so the apparent level of conservation drops down.

These numbers are based on the historic use of water from the period of 1970 through 1986. What we have done is taken a regression curve through those levels of water use, comparing them with population and with weather-related data, to develop a model that allows us to put in actual weather and compare with what we would have used historically under that same temperature, precipitation pattern, and population patterns in the current time frame on a month-by-month basis.

Now, in 1991, we hit the real crunch in water supply in Southern California. We were looking at drastic shortages in February. Fortunately, we did get a reasonable amount of precipitation from March that diverted us from absolute disaster.

But in March 1991, the City of Los Angeles implemented a mandatory conservation program. Each customer was expected and required to reduce their water use by 10 percent below

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1986, which was the most recent normal year weatherwise.

We saw our conservation levels shoot up to as high as 30 percent during that summer. It tapered a little bit during the winter, again because of the relative impact of indoor and outdoor conservation, and has maintained itself at well above the 20 percent level ever since.

I do have a couple of points down here that are below the 20 percent. Those may well be model errors in terms of being outside of the data of the model because of the very extreme heavy precipitation we had in these two months last winter in Los Angeles. So, it may be as much model error as reflected customer behavior, but we have seen as a result of our program, a consistent and steady conservation level to this point here.

However, it is very difficult to predict what the future will bring. I will contend that we have a data discontinuity at this point in time. We have changed customer patterns drastically. Will they return like they did in 1977-1978 where immediately a year after the drought they came up here? Probably not. But will they return in two or three years? As people get further down, they replant lawns that they allowed to die back. Some of the measures are permanent, we know, but the level of change is speculative at this point in time until we have some data for a couple of years of normal weather patterns, normal customer

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behavior.

Just to demonstrate in a tangible way our commitment to water conservation, and this is probably the most tangible way of putting our bucks on the line, and we in Los Angeles have done that. This is the level of expenditures that we have spent from 1988-89 through the budget for the current year. And you can see back in 1988-89 we spent 4 million dollars for shower heads, primarily that were distributed to our customers; a reduced level in 89-90 as we got into the drought, and then we jumped up substantially into the drought, 11 million, 26 million, a little less, 8 million last year, and a budget this year of 13.5 million dollars.

I will contend that you will not find this level of

spending from any other agency in California. In fact, our expenditures during the heart of drought for conservation measures was larger than that of the Metropolitan Water District serving all of Southern California.

Metropolitan is increasing their programs, our programs are being somewhat restricted just in terms of our ability to roll things out, so Metropolitan's expenditures are a little bit larger in the last two years, but we have put our money on the line and effectively produced water conservation.

As a follow-up to our programmatic efforts, and water conservation doesn't come from any one item, it's the overall

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spectrum of dealing with the public, getting many different things to catch their attention, the City of Los Angeles is using pricing.

Los Angeles, like most other water agencies, historically had a declining block rate structure, the more you use the less you pay per unit.

This recognizes the efficiency in the distribution system operations that result from these deliveries of large quantities of water, and therefore, the large users were rewarded with a lower unit price.

However, in 1976-77, during the previous drought, a blue ribbon committee was appointed by the mayor to review the water rate structure. This committee recommended the structure be modified to reflect the reality that water supplies are not unlimited and that future water supplies would be much more expensive.

This ultimately resulted in a uniform rate structure, where each unit of water costs the same. In 1985 the structure was again modified by adding a seasonal element recognizing there is more opportunity, particularly in the residential customer who uses the bulk of our water, to conserve water in the exterior uses, and therefore, by having a higher price in summer, you hopefully modify behavior in that area when it is effective to do so.

The conservation effect of our water rate structure

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was again increased in February 1992 when Los Angeles became one of the first major cities to apply marginal cost pricing directly in the water rate structure.

Under the new structure, residential customers pay for all the water used in excess of twice the median usage at a rate that is based on the cost of developing new water supplies through water recycling.

The rate structure also includes specific provisions for financing our water conservation and our water recycling programs by means of a surcharge of up to about 10 percent of our lower block rate that can be set at the discretion of our board.

We are continuing with very aggressive programs. Our rebate program has to date caused more than 330,000 toilets to be replaced in the City of Los Angeles. That results in a yield of about 2 percent of our metropolitan water supply that is permanently being conserved.

I would like to move on to water recycling. The City first began its water recycling efforts in the 1970s with the construction of the Tillman and Los Angeles/Glendale water reclamation plants, and the use of water from the Glendale plant for landscaping in areas that were near the plant, such as Griffith Park and some of the freeway medians nearby. Efforts to expand this use of reclaimed water during the 1980s were unsuccessful due to a combination of regulatory

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concerns over health issues, low customer acceptance, and relatively high cost of installing the facilities required to distribute the water from the treatment plant to where the customer would use it.

However, the department has begun to move much more aggressively in advancing the use of recycled water in the City of Los Angeles. The goal of the department is to meet the increased demand of the City for at least the next decade through a combination of reducing water use through water conservation, and increasing the supply through water recycling. This will eliminate needing to call upon water from other areas of the State to meet our growth that will occur.

To the extent that water from the Mono Basin is restricted to the City of Los Angeles, it will restrict our ability to meet the long-term goal of not having to import additional supplies to Los Angeles. The City Council established a goal of having 40 percent of the City's wastewater supply recycled by the year 2010. This supply will be used within the City and elsewhere in the Los Angeles basin, much of which will be used for activities other than displacing potable water.

For example, beneficial use includes the water down the Los Angeles River which has developed a very strong constituency to say let's leave the river flowing. It will

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be used for things like the Balboa Park Recreational Center, and it will be used for customers outside of the City of Los Angeles that will not displace our potable water supply.

However, in conformance with that goal, the Department of Water and Power has established a subgoal, and that subgoal is to see 80,000 acre-feet of water reclaimed, displacing potable water by the year 2010. That is roughly 10 percent of our projected needs in 2010 coming from recycled water.

Given the political support for water recycling, the availability of funds provided in the new rate structure along with potential co-funding from the Metropolitan Water District and Bureau of Reclamation, we anticipate being able to meet this goal and having water recycling being a major component in the City's long-term water supply.

As we move toward this long-term goal, we find our intermediate water recycling targets very elusive. When I first was assigned the task of putting together a program of water recycling, I had on the rose-colored glasses that we could do everything overnight, and it has not proved to be true. We have had substantial delays in bringing our projects on line, both in terms of regulatory and in terms of our own ability to work with the customers and to meet internal constraints in terms of logistics of agreements between ourselves and the Department of Public Works that

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supplies the water.

So, our programs have not moved as rapidly as I had hoped, but I believe we are well on the way to achieving our goal of 80,000 acre-feet by the year 2010.

Significant water from water recycling, however, is not likely to be available in the next few years, and thus, any water lost from the Mono Basin is going to be made up in the interim with increased purchases from the Metropolitan Water District, certainly until well into the next decade, and that concludes my direct testimony.

MR. DEL PIERO: Thank you very much. One question. 80,000 acre-feet you are anticipating reclaiming by 2010?

A 80,000 to be reclaimed, displacing potable water use. The distinction is the City's goal is actually 250,000, but much of that will be used for uses besides direct potable water displacement.

MR. DEL PIERO: Like what?

A Like the recreational uses. We did not have water going into Lake Balboa prior to water recycling, the water down the L. A. River, and water used outside of the City of Los Angeles such as the West Basin Municipal Water District project that takes our wastewater from the Hyperion treatment plant, and it is going to be marketing it to refineries and other areas in the south coast.

MR. DEL PIERO: What do they use now for water?

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A They're using MWD water through other agencies.

MR. DEL PIERO: They're using potable supply, but not yours?

A It is not my potable supply.

MR. DEL PIERO: I just wanted to understand that distinction. Before we begin with Mr. Hasencamp, I now know about transportation potential. The last flight for me to get to either Monterey or San Jose from Sacramento leaves at 7:45 Friday afternoon, Friday evening, so if I can get back here by probably 6:30, which would necessitate our leaving by no later than 5:30. So if that's okay with everybody, that will give us probably another hour and a half on schedule.

MR. CAHILL: In that case, we would start at 9:00?

MR. DEL PIERO: Is that acceptable to everyone?

MR. DODGE: That is fine, Mr. Del Piero, and in the interim, I have spoken to the pilot, and he confirms that there is, in fact, room for nine passengers.

MR. DEL PIERO: There is?
MR. DODGE: So we have plenty of room.
MR. BIRMINGHAM: Then I will fly back with you gentlemen.
MR. DEL PIERO: I appreciate that very much. Also, it is appropriate for the State Board to pay a portion of the share of the plane flight back, so if you would be kind enough to break out the price so you can get a proportional

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share of the break out, I would appreciate that.
I'm sorry, Mr. Birmingham, I wanted to get that out of the way.
MR. BIRMINGHAM: I was not going to have Mr. Hasencamp present an oral summary of his testimony at this time, but have him available for answering questions.
I would at this point make an application for an additional ten minutes for direct testimony because of the importance of the issues addressed by Mr. Gewe's testimony related to public trust balancing that is being conducted by the Board. This is essentially the second half of the balance, the City's water supply needs, and because the additional time would be used to respond to specific questions that were raised by members of the Board, specifically Board Member Forster during the examination of prior witnesses.
MR. DEL PIERO: I am inclined to grant that ten minutes.
MR. BIRMINGHAM: Thank you. I would like to hand Mr. Gewe a table that would be marked next in order. This is LADWP Exhibit 87, and I've already given ten copies to the State Board staff, but I will give to the two members here a copy.
Q Mr. Gewe, I would ask you if you are familiar LADWP Exhibit 87?

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A Yes, I am.
Q What is LADWP Exhibit 87?
A LADWP Exhibit 87 is intended to show an estimate of what costs could be, comparing the water that will be taken or would be released to Mono Lake under the LADWP Management Plan and under a 6390 minimum Mono Lake level, and the possible costs in current dollars related to those releases.
Q Now, there are two boxes on LADWP Exhibit 87 which I'm just going to call 87, if I may, and the top box has five columns, four of which are labeled at the top -- The first labeled column is labeled Transition Period to 6390 Feet, Total Acre-Feet in Excess of Fish Flows. Can you tell us what is meant by the term "Transition Period" to 6390 feet?
A The transition period is that period of time that would be required for the lake level to move from where it is today to reach 6390 under and estimated historic hydrology, using the 1941 start date.
It is estimated if that particular sequence of years occurred that it would take 16 years for the lake to go from where it is today to 6390.
Q Does that assume any diversions out of the Mono Basin?
A The DWP Management Plan assumes some diversion, the 6390 minimum, and the 16 years assumes no diversions from the Mono Basin for that 16 years to get to the 6390 lake level.
Q In fact, under the LADWP Management Plan, isn't it

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correct the lake would not get to an elevation of 6390?
A That is correct. This is the same period of time that the lake level would not rise to that level.
Q Now, under the transition period to the 6390 minimum Mono Lake level, it indicates there would be 1,083,300 acre-feet of water that would be released into the lake; is that correct?
A This would be the release in excess of the water already committed to meet fish flows.
Q And under the column in the top box on Exhibit 87, it indicates a cost of 344.5 million dollars to replace that water. What were the assumptions made in calculating that projected cost of 344.5 million dollars.
A That cost is based upon the roughly one million acre-feet of water that would be used during that 16-year period at today's untreated water rate for the Metropolitan Water District, which is 318 dollars an acre-foot.
Q Is that cost shown in the box labeled, Water Replacement Costs, in the bottom box on Exhibit 87?
A That's correct.
Q Did you anticipate that cost will remain stable over the 16-year transition period?
A No, because the cost of Metropolitan Water District water is expected to rise substantially. The most recent projections by the staff of Metropolitan Water District call

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for 7 percent increases each year through the end of the decade. These numbers are lower than the numbers they have projected just two months ago, but the current projection is 7 percent per year increase through the end of the decade and undetermined increases in the future.
Q Now, the last two columns in the top box on Exhibit 87 are entitled, Equilibrium Period and Projected Costs. Can You please explain the two numbers, 9600 acre-feet and 24,300 acre-feet that are in the column labeled Equilibrium Period in that top box?
A Once the lake has reached an equilibrium point, a certain amount of water will be required to maintain the lake at that equilibrium level. The 9600 acre-feet on the DWP Management Plan is the amount of water in excess of the fish flows that would not be available to Los Angeles. If the lake is at the higher level of 6390, it would require an additional 24,300 acre-feet beyond the fish flows to maintain that lake level given the hydrology assumed.
Q Can you please explain how the projected cost of that water was calculated? Am I correct, that information is contained in the last column in the top box in Exhibit 87?
A That is correct. The right-hand column on the top box is the extrapolation of the 9600 acre-feet times the current Metropolitan Water District untreated water costs. So, in current dollars with what is happening today, it would cost 3

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million dollars to maintain the lake level under DWP's management plan, and it would cost roughly 8 million dollars a year to maintain the lake at 6390 once it was there.
Q Now, if it is necessary to replace water that is kept in the basin to maintain the lake level, the Mono Basin, with ewclaimed wastewater or desalination, how would the projected costs that are shown on Exhibit 87 be affected?
A The costs would obviously rise in direct proportion to the quantities of water that came from more expensive sources. Again, reclaimed water has a range of costs, desalination has a range of costs, but the cost would increase relative to how much water you take from those sources.
MR. BIRMINGHAM: I have no further questions.
MR. DEL PIERO: Thank you very much, Mr. Birmingham. I am going to allow Ms. Forster to ask a couple of questions as she has a speech in 30 minutes that she has to leave for, so rather than going through the normal order, I will afford her the opportunity to ask first. Ms. Forster.
EXAMINATION
by MS. FORSTER:
Q I think I'm going to premise this because of the official record with an introductory statement. My introductory statement would be that I realize that this whole proceeding is not primarily concerned with

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socioeconomics. If I understand from the judge's decision, the Board is looking at an environmental decision on how we manage the fish, the protection of the fish and wildlife resources. Now, maybe I am wrong. I see the attorneys looking at each other. and you can help me understand if you think differently. But I'm always concerned about socioeconomic statistics, and I like to get down to the per capita, and that's just one of the my favorite things to do, and in looking at this, I'm going to parallel it to a press clip I read on the bus coming in this morning. It was talking about the Los Angeles San district going to a secondary treatment plant and said that they would be constructing a 400-million-dollar wastewater treatment plant, and I know you're not going to be able to do this right now. but I will show you what I am looking for, construct a 400-million-dollar wastewater treatment plant, and when they were talking about the cost to the people of their area, they broke it down to an average family would pay 200 dollars over a 20-year period, or 5 to 10 dollar increase a year for secondary treatment.
And I guess what I'm interested in is that we never

simplify the testimony to, is if you take this 6390 chart that you have, and is your chart saying it rounds out to be a loss of 24,300 acre-feet?
A That would be once you get to equilibrium. For the 16

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years to get to equilibrium, it takes more than a million acre-feet to get the lake to that level.
Q Well, you see, I'm trying to think, I'm trying to get down to just what are you looking at on a per capita basis because large figures are always so overwhelming, but when you boil it down, it is not quite so difficult to comprehend the doableness of some of these projects.
So, I still would like this refined more using the example I did of this sanitation district. We had some people up here, and we were trying to determine how many connections you had, and it would just be nice to get it down to what you think it would do per capita, and if your attorneys don't think it is appropriate, maybe I understand why you wouldn't, but I would like to know that.
MR. BIRMINGHAM: May I conduct a further examination?
MR. DEL PIERO: Okay.
DIRECT EXAMINATION (CONTINUED)
by MR. BIRMINGHAM:
Q Mr. Gewe, we have heard testimony from some people about connections. How many residential connections are there in the City of Los Angeles?
A There are roughly 400,000 single family connections.
Q And how many multi-family connections are there, approximately, do you know?
A There would be about another 80,000, somewhere in that

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magnitude.
Q So, that would mean that with respect to the number of single family connections to calculate the cost of the 6390 minimum lake level after reaching equilibrium, it would be taking the annual cost and dividing by approximately what number?
A If you do it on a per-connection basis, you would divide that by roughly 480,000 for the residential connections with about two-thirds of the costs, I guess, being borne by the residential customers.
Q And approximately, I don't know if you have a calculator, what would be the per-connection cost on an annual basis.
A Your hearing room is too dark -- Oh, there it goes. Now, will you ask the question.
Q Using the 480,000 connection figure, and you said approximately two-thirds of the cost would be borne by residential customers, what would be the per-connection cost?
A For the 16-year period to get to transition would be roughly 480 dollars if the rate is the MWD untreated water rate of today.
MR. DEL PIERO: I want to make sure -- Did you back out not only multi-family but commercial and industrial use?
A That was including both multi-family and commercial --
MR. DEL PIERO: And you've got a variable pricing

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structure, and so, Mr. Birmingham, I appreciate your trying to get this information, but at this point it is going to be difficult for us to do that without being able to precisely calculate the industrial use. I had hoped when you started that maybe we would be able to do it, but I started remembering about the variable pricing structure, so it is not going to work out that way.
MR. BIRMINGHAM: Q Is it possible to calculate, and this may be responsive to Mr. Del Piero's concern, is it possible to calculate simply the per-connection costs?
A You can calculate a per-connection cost, but whether it is meaningful is questionable.
Q Why would it not be a meaningful number?
A Because one connection is going to pay considerably more than another connection based upon how much water they use.
Q Now, I'm going to ask you a hypothetical question, and I'm going to ask you to answer it by expressing an opinion based upon your experience as an individual charged with implementing pricing policies of the Department of Water and Power.
Is there a large proportion of the population of the City of Los Angeles that falls below the poverty level?
A There is a significant portion.
Q Do you have any information about the median income

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level for the people in the City of Los Angeles?
A I don't know it off the top of my head. It's available.
Q Have you ever attended public hearings where individuals appear to object to increases in rate structure that would result in less than 10 dollars per year in increases?
A Yes, I have.
Q And hypothetically, if as a result of a decision by this Board the cost of water for individuals who reside in South Central Los Angeles was going to be upped 12 dollars per year, what would be the reaction of individuals residing in South Central Los Angeles?
MR. FLINN: I'm going to venture an objection. Attendance at public hearings, watching people complain about their water rates, may not really rise to the level of being an expert on the public opinion issues to which that question is directed. I think it goes beyond this witness's expertise.
MR. BIRMINGHAM: Q Let me restate the question.
MR. DEL PIERO: I will sustain the objection.
MR. BIRMINGHAM: Q Do you have any information from which it can be inferred that people who live in South Central Los Angeles would have difficulty paying an increased water bill of 12 dollars per year?

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A There are representatives in the City Council who have expressed that strongly to me in the past.
Q So, while someone who lives, say, in Palo Alto may be able to pay 12 dollars per year, somebody who lives in South Central Los Angeles might find it more difficult to pay 12 dollars per year?
A That is the testimony of the representatives.
Q Does the disparity in ability to pay make the per-connection cost calculation more or less meaningful, if it affects it?
A The disparity probably makes it less meaningful because the impact would be borne largely by many people who can pay a higher amount.
MR. BIRMINGHAM: Okay.
MR. DEL PIERO: Thank you very much, Mr. Birmingham.
EXAMINATION
by MS. FORSTER:
Q I don't know if you can answer this one, and I'm just using this opportunity to throw it out. When you talked about your conservation and your water reclamation program, how much money did Los Angeles realize through, is it AB 444?
A That's correct.
Q So, you had AB 444, and there was an amount in there to help Los Angeles move on to have financial resources to figure out how to plan for the future with an eye on the

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sensitivity for protection for Mono Lake. How has that money been utilized, and will it keep coming? I mean, how much is it? How have you utilized it as a city? How do you plan on utilizing it in the future? Is it dependable, what is happening?
A To date we have received no money from AB 444, because receiving money is conditioned upon solving the issues involved in the matter before you. There is money that was set aside. However, to my understanding, there has never been any money actually appropriated against the authorization.
So, to date we have had no money from it. At this point in time it is unclear as to how much may come to Los Angeles.
Q How much is in there? How much are you supposed to get when everything is settled?
A I am not directly involved, but my recollection is that it is something over 40 million dollars.
Q 40 million dollars a year?
A Total.
Q And does it have a life, like so many years?
A You are getting beyond my expertise. I am familiar with the issue but not directly involved.
Q Is Los Angeles still doing its aggressive water conservation retrofit program?
A Yes, it is. As you can see, our expenditure for this

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year is budgeted at 13 million dollars. That's quite aggressive.

MS. FORSTER: Thank you.

MR. DEL PIERO: Thank you very much. Ms. Cahill.

CROSS-EXAMINATION

by MS. CAHILL

Q I would like to take another stab at getting at the issues Ms. Forester has been raising. Did I hear you say that approximately one-third of the water went to commercial uses and approximately two-thirds to basically domestic use?

A Approximately two-thirds goes to domestic use, but in the additional uses there's industrial, commercial, and governmental, which is also substantial usage.

Q Does Los Angeles DWP serve the entire population of the City of Los Angeles?

A Essentially.

Q And so how many people is that?

A Roughly 3.5 million.

Q So, approximately 3.5 million people use approximately two-thirds of the water; is that right?

A For residential uses.

Q So, if you're looking at the table for the projected cost during the equilibrium period, you would have a cost of 3.1 million dollars for the Los Angeles DWP Management Plan and 7.7 million dollars for the 6390 level; is that right?

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A That is correct.

Q And so the difference between those two would be how much?

A Roughly 4 million dollars, 4.6.

Q What would be two-thirds of 4.6?

A Roughly 3.

Q Roughly 3 million dollars?

A That is correct.

Q So, in other words, the additional cost is approximately 3.5 million dollars; is that correct?

A Once equilibrium is reached.

MR. DEL PIERO: Actually, that's not correct because you have variable pricing.

A Assuming the price –

MR. DEL PIERO: It causes industrial water to be higher than residential water; is that correct?

A No, that is not correct. The average cost per residential and nonresidential water is the same. Within the classes is where the distinction takes place.

MR. DEL PIERO: Oh, really, so it is based on consumption then?

A That is correct.

MR. DEL PIERO: The larger the amount consumed the higher the price per unit?

A For residential customers, that is true. For

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industrial it is based on the seasonal amount of the water use.

MS. CAHILL: Q Roughly, though, would it be accurate to conclude that the additional cost would be approximately one dollar per person?

A If the assumption on cost data using MWD prices is the source, that is correct.

Q Thank you. Let me just clarify a couple of things on this exhibit that was handed out today. It says transition period to 6390, and then it says, total acre feet in excess of fish flows. Which fish flows?

MR. HASENCAMP:

A Those are the fish flows in the LADWP Management Plan.

Q So, those are not the fish flows recommended by the Department of Fish and Game?

A No.

Q And did I understand you to say, Mr. Gewe, that the Los Angeles DWP Management Plan, while it's listed here for the transition period for 6390, wouldn't that cause the lake to get to 6390 within that period of time?

MR. GEWE: A That is correct.

Q With regard to the transition period to the 6390 minimum lake level, you, in effect, assume there would be no diversions at all until the lake reached that lake level?

A That is correct.

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Q So, that's different from some of the assumptions in the EIR which had a transition period that allowed some diversions even before the lake level was reached. is that right?

A I am not expert on the plan in the EIR.

MR. HASENCAMP: A Yes, that is right, but the transition period will be longer if diversions are allowed.

Q Right, and if this were a longer transition period, then clearly the amount would be lower, wouldn't it, because there would be more water available for diversion to Los Angeles?

A Yes.

MS. CAHILL: Thank you, no further questions.

MR. DEL PIERO: Thank you very much. Mr. Dodge -- Mr. Flinn.

CROSS-EXAMINATION

by MR. FLINN:

Q Good morning, Mr. Gewe and Mr. Hasencamp. I'm Patrick Flinn. I'm one of the attorneys for the National Audubon Society and Mono Lake Committee, and I want to ask you a few questions.

First of all, while we had Table A up there, I was trying to figure out sort of cost in acre-feet for your water conservation measures, and am I right that in 1992 your biggest expense of 26 million dollars there was approximately

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25 percent over that period, 25 percent water conservation savings?

MR. GEWE: A That is correct.

Q Now, with some help, I did some arithmetic over the break. If you look at what that savings entailed, the 26 million dollars, that works out to the cost of about 150 dollars per acre-foot for your water conservations efforts. is that right?

A That calculation would be correct, but I'm not certain the judgment is valid, the comparison is valid.

Q But in any event, assuming the validity of the comparison, water conservation effort costs, if you will, approximately half the 300 dollars an acre-foot of the MWD untreated noninterruptible; is that right?

A If you take the general picture you took, that is correct. On a program-by-program basis, it is not necessarily so.

Q Let's talk about conservation. Back to your other figure -- Now, you remember Dr. Wade, an economist LADWP hired to give testimony here?

A Right.

Q Were you here when he testified in 1992 that there was no water shortage in Southern California?

A I was not here for his direct testimony. I came in through his questioning.

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Q Assume he did testify that in 1992 there was no water shortage at all. Isn't it correct that from 1992 and 1993, at least the first two years after the official ending of the drought, Los Angeles' conservation efforts are still in the 20 percent range?

A That is correct.

Q Wasn't this past summer one of the hottest, driest summers on record?

A No, that is not correct in Los Angeles.

Q Was it abnormally wet in Los Angeles?

A It was a fairly normal summer.

Q So, with at least a fairly normal summer, and with the drought two years over, we haven't seen the rebound, the immediate rebound that we saw in the earlier drought; is that right?

A Not nearly the same degree.

Q Aren't there a number of major projects that Los Angeles is doing this time around that it didn't do last time around to make the water conservation savings more permanent?

A That is absolutely right.

Q Isn't the pricing structure one of them?

A That's one of them.

Q The retrofit of the ultra low flush toilets is one?

A That's the primary one.

Q Are there others that are more permanent structures

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that were impermanent the last time around?

A Again, the development of our industrial program is an additional one.

Q So, the industrial water conservation measures were a third thing that's being done this time around. that you try and capture what might have been lost in the late 70s?
A That is correct.
Q Let's look at the projected demand, the large bar here, the middle range here, that gets us up to 756 in 2010. This was from the 1990 Urban Water Management Plan; is that right?
A Issued in 1991.
Q And this Urban Water Management Plan did not take into account the effect of things like best management practices.
A Did not fully take those into account.
Q But you do have this plus or minus 8 percent range that it could be higher or could be lower?
A That is predominantly a weather factor.
Q Well, now, given the fact that we have got at least two years of record so far with 20 percent conservation, and given the permanence of these water conservation measures, wouldn't you feel comfortable estimating that we probably would be on the low side of those projected demands rather than the high side, all other things being equal?
A At this point in time it would probably be on the low

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side, but there are factors going both directions for the long term.
Q Now, let's jump into water reclamation. I tried to put together a map that I hope you'll be able to tell whether or not you agree with it, water reclamation projects in Los Angeles area, and I'm going to apologize in advance. We were unable to include on this map water reclamation projects in the Orange County area. We wanted to include them, but our resources were limited, so there will be a big hole in Orange County there, and I apologize --
MS. FORSTER: And that is an area which has so much reclamation.
MR. FLINN: It has, and that is one of the reasons why we wanted to include it. We will be marking this and passing out copies. We were unable to make them in color. First of all, are you familiar generally with the water reclamation projects in the Los Angeles County area?
A Yes, I am.
Q Okay. And just as a road map, as a guide to this map and your legend, the black areas are the water reclamation projects in existence, and the blue ones are water reclamation facilities in the planning stage.
Do you recognize this as an accurate depiction of those facilities?
A Generally accurate, not in all the details.

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Q Now, in red we tried to draw the City of Los Angeles boundaries. Do you recognize the areas as generally encompassing the City of Los Angeles boundaries?
A Yes, I do.
Q Now, looking at that map, I notice that a large number of the facilities here, the blue ones, appear to be largely outside of the City of Los Angeles boundaries, and the one major one under construction is the Tillman plant. Is that also consistent with your understanding of current planning?
A That is correct.
Q Now, of these facilities, the Pomona, the San Jose Creek, the Whittier Narrows, Los Coyotes, Long Beach, are any of those among the water reclamation projects that in your testimony you are estimating would produce the 80,000 acre-feet of water reclamation for the City of Los Angeles?
A There is a small potential of getting water from the Rio Hondo Plant as a county sanitation district. Other than that, reclamation in Los Angeles would come from our own facilities.
Q But all the other ones that are mentioned are in addition to the water reclamation that you have projected in your 80,000?
A That is correct.
Q Is there anything sort of geological or geographical that would prevent the kind of coverage inside of the City of

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Los Angeles that we see immediately to the south and east of Los Angeles?
A Yes. Water reclamation, like real estate, is location, location, and location. Los Angeles has its primary treatment plant on the coast where it is more difficult to get into the areas of higher use which make economic sense.
Q And we have Tillman Glendale. They are not on the coast.
A That is correct. The water that is produced at Tillman and Los Angeles/Glendale is being treated to tertiary standards, and our game plan is to utilize that first prior to making up major initiatives of the water that is not treated to that level at that Hyperion Treatment Plant.
Q Now, you mentioned that the City of Los Angeles has a goal of recycling 250,000 acre-feet of water by the year 2010, 80,000 of which would displace potable supplies in the City of Los Angeles. Do you recall that testimony?
A That is correct.
Q Of the remaining 170,000 acre-feet, how much of that is estimated to replace potable supplies which MWD would otherwise have to supply?
A I do not have a number on that.
Q Do you have an order of magnitude? Is it a tenth of that or 90 percent of it?

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A It would probably be in the neighborhood of 50 to 60 percent, maybe, recreational use being the remainder.
Q Let's pick a number, 80,000 acre-feet, which would replace potable supplies, so we take that 80,000 and your 80,000, so that's 160,000 acre-feet of water available to reclamation in Southern California, replacing potable supplies that MWD might otherwise have to supply; is that right?
A If that goal is met, that is correct.
Q Were you involved in submitting LADWP comments on the Draft EIR?
A I was involved, yes.
Q And do you recall in those, 3 points were made about the difficulty in developing additional reclamation supplies, public acceptability, regulatory concerns, and costs?
A That's correct.
Q Okay. First of all, on public acceptability, am I not correct that a statute has been enacted requiring users of nonpotable supplies to use reclaimed water if it is available at the same cost as potable supplies?
A That is correct.
Q So, with regard to that particular water use, public acceptance has already been decided by the Legislature; is that right?
A Should the local policy makers choose to implement it.

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Q And hasn't the City of Los Angeles, Office of Water Reclamation, engaged in a substantial public educational effort on educating the public about the safety and reliability of reclaimed water?
A Certainly made a major effort.
Q And with regard to cost, you testified, I believe I heard you say that currently L.A.'s planning puts a limit on reclamation costs of 750 dollars an acre-foot: is that correct?
A That is correct.
Q Am I understanding you correctly that this represents a decision, sort of a financial decision, that basically if it costs more than 750 dollars an acre-foot to build, it's probably not worth the expense of building it?
A Not totally correct. It is correct in terms of building it. Now, that is not to state that in the future that would not be revised.
Q Were you here when Dr. Wade explained to us that, in his opinion, given water shortages in Southern California currently, the next acre-foot of water is worth 4,000 dollars an acre-foot?
A I heard his testimony.
Q I think that is not a view shared by the people that have to make the financial planning decisions in the City of Los Angeles; is that right?

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A That view is not held in terms of the long-term supply, although in an instance it could come true.
Q Could you describe what conjunctive use is?
A Conjunctive use is coordination of groundwater and surface supplies so that you can maximize the total availability of water by storing the surface supply underground in years of plenty and taking it from the ground

during years of lack of surface supply.
Q Is this something LADWP has always done, or is this a relatively new plan?
A The concept was originated by William Mulholland in the 1920s when we first developed our aqueduct system. It has been carried out with varying degrees, depending on implementations. We had our ability to do it somewhat restricted in some of our litigation in groundwater in the Santa Ana Basin in the 1950s.
Q Now, I am showing you National Audubon Society/Mono Lake Committee Exhibit 4. You may not have seen this document before. Let me tell you, it is really divided into two halves, the past and future. The past attempts to graph from where the City of Los Angeles from 78 to 93 got its water, and then under the model that is yet to be introduced into evidence, where Los Angeles might get its water in the future, going forward.
But just focusing in terms of conjunctive use in the

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past year, is it not correct that in the past year Los Angeles has bought relatively larger quantities of Metropolitan Water District water and reduced the groundwater pumping because MWD water is available now, and you could buy that now and sort of hold your groundwater in reserve for a dry year?
MR. BIRMINGHAM: Objection. compound.
MR. DEL PIERO: Do you want to explain to me why you think the question is compound, because I understand it completely. In fact, I am familiar with what the purchasing policy has been, so tell me why you think it is compound.
A I understood the question.
MR. BIRMINGHAM: Could I have the reporter --
MR. DEL PIERO: Would you like the question read back?
(The reporter read the question as follows:
But just focusing in terms of conjunctive use in the past year, is it not correct that in the past year Los Angeles has bought relatively larger quantities of MWD water and reduced the groundwater pumping because MWD water is available now, and you could buy that --)
MR. DEL PIERO: Hold it. Sustained.
MR. FLINN: Q Could you describe generally the conjunctive use decision that was made with regard to this past year vis-a-vis Los Angeles water supplies?

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A Because of the availability of surface water as a result of the substantial precipitation of last winter, we made a conscious decision to increase our Metropolitan Water District purchases in the neighborhood of 50 to 60 thousand acre-feet this year and reduce groundwater pumping accordingly so the water would be available in the future. It was a good economic decision because the water was available to reduce price.
Q You are interested in the current capacity to pump out of the groundwater basin. How much do you get a year?
A It is difficult to give you a specific number. because water quality considerations do affect our ability to pump. If you look at just the capacity of the wells, possibly as high as 350,000, 400,000 acre-feet a year. But pumping at a well doesn't get it into the system and utilized.
Historically, the highest pumping we have had is 136,000. Our current planning is looking at 180,000 ability to use in the system.
Q That is taking into account the quality concerns?
A That is hoping the water quality concerns don't affect us again. It is something that is very difficult

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to predict. The state of knowledge of the movement of contaminants is not great.
Q Do you know enough about the subject, and you may not, to know the extent to which the more water you put in in particular places, you can change the shape and flow of the contamination plume?
A I'm familiar, but not an expert.
Q And do you know enough one way or the other as to whether or not the more you put into groundwater and dilute contaminants, the less your contamination problem is?
A It is site specific. In some cases that would be true, and in others it would not.
Q Now, let me turn to Metropolitan Water District questions. You talked about MWD supplies, but to preface that in your testimony, and I'm going to paraphrase it, you said that Los Angeles plans to meet its increased demand with a combination of water reclamation and demand management and demand reduction methods. Do you recall that?
A Yes.
Q Now, currently, and for the last three or four years, DWP's gone entirely without Mono Basin water; is that right?
A That is correct.

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Q It just seems to follow logically, and tell me if my logic is wrong, currently you are going without any Mono Basin water, and you can meet future demands with reclamation and demand management assuming MWD water supply at least remains at current levels, aren't you able to do without all Mono Basin water?
A Only if you assume there is no increased demand elsewhere in Southern California on MWD water.
Q Now, let me briefly revisit one issue with respect to other people in Southern California. Will you describe what DWP's entitlement to MWD water is?
A By the MET Act, DWP is entitled to a proportionate share of MET water equal to the total contribution by taxes to MET's capital improvement facilities.
Q Meaning the City of Los Angeles taxpayers have in essence paid for an entitlement to a certain percentage of MWD's costs?
A In accordance with the MET act.
Q How close has DWP in its history come to taking its entitlement?
A DWP has been unable to get its entitlement on those occasions where it has desired to take it. It has never come close to taking it.
Q When you say it has been unable to get its

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entitlement. what do you mean?
A The only two occasions whereby we would have utilized a percentage approaching our entitlement was 1976-77 and the 1991 time frame when we were in mandatory rationing and MWD chose to ignore the Act and allocate water based on historic use.
Q Did DWP seek to vindicate its legal rights to that water in court?
A DWP chose not to pursue it in light of our experiences of being unable to obtain water from the ranchers in the Owens Valley in 1976-77 which was clearly under contract saying that they were interruptible, so we felt it was highly unlikely we could prevail in taking water away from San Diego.
Q Who made that decision?
A That would have been made somewhere within the legal staff, I'm sure.
Q In terms of percentage of entitlement, what is the largest percentage of entitlement DWP has ever taken?
A A ball park number would be something like 15 percent, but I am not sure of the exact amount.
MR. HERRERA: Time, Mr. Flinn.
MR. FLINN: If I could have an additional ten minutes.

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MR. DEL PIERO: That's fine. Mr. Flinn, I'm going to grant you that immediately after lunch. We are going to break right now and be back at 1:15 promptly.
(Noon recess)

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WEDNESDAY, DECEMBER 1, 1993, 1:00 P.M.

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MR. DEL PIERO: Ladies and gentlemen, this hearing will again come to order. When last we left, Mr. Flinn was examining the witnesses.

MR. FLINN: I'm going to try and use less than my last ten minutes here. I've passed around and given to the parties and witness a document marked as National Audubon Society/Mono Lake Committee Exhibit 223, and this document contains the cover page of a bond prospectus, an MWD bond prospectus from June 1993, and then the excerpt from pages 24 through 38 representing a discussion in the prospectus of Metropolitan Water District's water supply and demand situation.

First of all, Mr. Gewe and Mr. Hasencamp, have either one of the two of you ever seen a copy of MWD's bond prospectus before?

MR. GEWE: A No.

Q Are you aware that MWD from time to time issues bonds to finance its operation and construction?

A Yes.

Q And are you aware that in that process, consistent with laws governing these kinds of instruments, MWD is required to make disclosure about its operation and prospects?

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A Yes.

Q I would like you to turn to the second page of the exhibit, page 24, under the heading, Ability to Meet Water Demands. Let me preface my question by returning to the questions we ended up with before lunch in which you had talked about the assumption that I asked you my question about, assuming MWD would be able to continue to deliver at historical levels, and you said that assumes MWD can meet increased demands. And Metropolitan discloses in its prospectus beginning: Metropolitan believes that prospect for securing additional long-term water supplies are good.

Let me stop there. Is that statement consistent or inconsistent with what you understand to be Metropolitan's current belief about its ability to increase long-term supplies?

A It would be consistent with staff belief at MWD.

Q Do you have any understanding as to what kind of review a document like a bond prospectus has to go through before it is officially sent out in a financial community?

A Not really.

Q If I were to ask you to assume that it is probably one of the most rigorously scrutinized document a private or public entity can issue -- Strike that. Let me just move on.

There is a discussion here, and I won't dwell on the various pluses and minuses of the possibilities for losing

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water and the possibility for gaining water, including the bay-delta process and others, and I want you to turn, if you could, to a table near the end which is page 36, a table entitled, Comparison of Water Supplies and Demands. And first of all, I know you probably haven't had any chance at all to review this, so I'm going to walk you through it step by step.

If you look at it in terms of existing supplies, do you see that it is merged in the Metropolitan along with its member agencies including DWP?

A That's correct.

Q So in terms of supply, it includes Los Angeles Aqueduct as a supply source, and do you see there its projections for the Los Angeles Aqueduct from 1995 to 2010 are at 370,000 acre-feet of water a year. Do you see that?

A Yes, I do.

Q Do you understand that assumes no Mono Basin diversions at all?

A I'm not sure that's correct.

Q We could go through the document and ask you to assume that is, in fact, the case.

Generally, is it true that in water supply planning practice when some substantial question arises over one's entitlement to water in terms of planning, one simply assumes you're not going to get any of it?

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A Not necessarily.

Q As a general matter, isn't that true?

A We would look at both aspects, the worst case and probabilities.

Q Let's drop down to the Colorado River. You see there the actual 1992 is 1.2, and jumping to 1995, all of a sudden we have that. Do you understand that that is part of a fairly standard practice of MWD when making projections about its supplies, to assume that it doesn't get any more than its legal entitlement to the Colorado River water in the future?

A That appears reasonable.

Q And even though their legal rights were adjudicated back in 1964; right?

A I don't remember the exact year.

Q Mid-60s, and Arizona, in fact, starting in 1985 began to divert water, but even so, as of last year they still got their standard historical 1.2 million acre-feet; right?

A That is correct.

Q Let me ask you to assume that this document is being conservative both with regard to Colorado River and with regard to Mono Basin, assuming no Mono water and no excess Colorado River water, following down there under Potential Shortage, do you see it projects shortages in the year 2010, a potential shortage of 750,000 acre-feet. Do you see that?

A That's correct.

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Q And then they have a dry--it goes up to 1.2 million or 1.4 million, depending upon different drought conditions. Do you see that?

A Right.

Q And then there's a section entitled, Probable Increases in Supplies. Do you see that?

A Yes.

Q And to summarize the conclusion of this table under any of these scenarios, MWD, with these additional probable increases in supplies, reclaimed water, transfers, additional Colorado River water, additional State Water Project water, still is able to meet these additional demands that it projects. Am I reading the table consistent with how you would read such a table?

A Yes, sir.

Q And generally is the conclusion set forth in this table consistent with what I understand it to be, the information that MWD is telling the public at large?

A MWD is going through a reexamination of the water supply situation. I'm not sure that they are making much in the way of public pronouncements at the moment. This certainly is a public document and in that sense reports their official position. As I say, they are undergoing an integrated resources plan at the moment, reevaluating all of the resources, and I'm not sure they would be prepared to

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state how they would meet these in the future exactly.

Q You are not aware of any later MWD publicly issued documents in this bond prospectus from the summer of 1993?

A My impression is that is the most current data.

Q Now, I want to conclude and visit briefly this issue of -- Maybe I won't. I think I will just conclude. Thank you.

MR. DEL PIERO: Thank you very much, Mr. Flinn. Ms. Koehler.

MS. KOEHLER: My name is Cynthia Koehler. I am here representing California Trout.

CROSS-EXAMINATION

by MS. KOEHLER:

Q Mr. Gewe, it is your testimony that Los Angeles has embarked on a very ambitious water conservation program in

the last few years; isn't that right?
A That is correct.
Q Is it your belief that the water conservation programs will result in savings which will decrease water demands?
A It will reduce water demands, yes.
Q And in your written testimony you indicate that your best estimate of Los Angeles' demand for water in 2010 as of today is Figure 1 of your testimony, which is 756,600 acre-feet?
A That would be the official position at this point in

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time until we have more data that we can reasonably justify. I'm not saying that is the number, but that's the best number we have at the moment.
Q Your Figure 1, I believe you testified to this, is from the 1991 Urban Water Management Plan. I believe that figure is 3.3-1.
A That is correct.
Q Isn't it correct that the Urban Water Management Plan states that this Figure 1 in your testimony does not include water conservation from programs that were not implemented as of the date of that plan?
A It includes values of programs probably differently, but it does include water conservation measures not necessarily in the program today.
Q Let me make sure I understand it. The Urban Water Management Plan from which this is taken states that the demand numbers in that figure do not include conservation from programs that were not implemented as of that date, the date of that plan.
A That is correct.
Q And you are familiar with the Memorandum of Understanding regarding urban water conservation signed by the urban water agencies?
A Certainly.
Q And L. A. is a member of that?

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A Yes.
Q Is it also your testimony that you are familiar with the BMPs listed in that Memorandum of Understanding?
A Yes.
Q And then you are familiar with BMP-16 which requires water agencies such as Los Angeles DWP to implement programs for replacement of toilets?
A That is correct.
Q Are you aware of SB 1224 which requires all toilets sold in the State beginning January 1994 must be ultra low flow?
A That is correct.
Q Isn't it correct that the MOU agreed to implement the BMPs and SB 1224 were all adopted after the 1991 Urban Water Management Plan was released?
A Yes. But some of those programs were conducted independent of the MOU prior to its adoption. We did include a level of toilet replacement in the Urban Water Management Plan.
Q Obviously, we are going into higher levels today.
Does the demand estimate in Figure 1 of your testimony from the 1991 plan, does that demand estimate reflect L. A.'s September 1991 agreement to implement BMP-16 for SB 1224?
A No, it does not.
Q Does the 1990 report reflect savings likely to occur

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given these changes that have taken place since 1991 with regard to the ultra low flow toilet program?
A It does not reflect the current level of that program.
Q Doesn't the 1990 plan estimate that by 2010 there will be only a 20 percent turnover in ULFTs by 2010?
A I don't remember the exact number.
Q Does that sound right?
A It is in the right range.
Q Wouldn't you agree that this turnover rate is now too low in light of BMP-16 and SB 1224?
A Yes.
Q I understand your written testimony to be that due to the ULFT program that has been in effect to date, there has resulted a permanent reduction in water use of about 2 percent?
A That is correct.
Q And that permanent change is not reflected in your Figure 1?
A A portion of it would be. Much of it is not.
Q Do you have an estimate of what that 2 percent translates into in terms of acre-feet?
A It is about 16,000 acre-feet a year currently.
Q At the current level. In your testimony you discussed various programs in addition to the ULFTs which Los Angeles has undertaken to encourage water conservation. Does Figure

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1 in your testimony reflect the water savings which are likely to accrue from commercial, industrial, and governmental ULFT programs which have been implemented since the 1991 plan?
A No.
Q Does Figure 1 reflect the water savings which may accrue from L. A.'s new rate structure which was implemented in early 1993?
A Not entirely. We had looked at price impact of rates, so there is a rate impact in the calculations used on that, but we did not include the changing structure in the conservation water use levels.
Q To what extent do you feel that Figure 1 reflects the reduction in demand that is attributable to the new rate structure implemented in 1993?
A It does not include the impact of the changing allocation, but it would include the overall total cost increase.
Q I'm sorry, the total cost increase?
A The increased average cost of water is included in there. The restructuring where some people pay more and some people less is not included in there.
Q Is the reduction in demand that you estimate will occur as the result of this savings reflected in the Figure 1 demand estimate?

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A Again, the portion dealing with the total cost of water, yes. The portion that will occur as a result of a certain portion of the customers paying higher prices for water is not.
Q Does Figure 1 reflect the water savings which may accrue from rural programs which have been implemented since 1991.
A There have been no such programs implemented.
Q Are there going to be such programs implemented?
A There are no current plans at the moment.
Q Isn't that a BMP?
A No.
Q Does Figure 1 contain the water savings which are likely to accrue from your outdoor water conservation programs outlined in your testimony which have been implemented since the 1991 plan?
A Again, it's partial.
MR. BIRMINGHAM: We will stipulate an additional ten minutes.
MR. DEL PIERO: It is kind of Mr. Birmingham to make that offer. I'm surprised Ms. Book hasn't said something yet. (Laughter.)
A In responding to your question, we did include some of those programs in that we increased the intensity and level of the programs. In 1990 we had mailed out long watering

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guards to our customers. So many of these things were in place. We obviously have increased the intensity of them, and they have not been totally factored into the long-term picture.
Q Isn't it further your testimony, as I understood you this morning, that the recent drought has resulted in a permanent change in water use in the service area?
A That is correct.
Q And I would like to make a distinction here between the permanent reduction attributable to the ULFT program in place so far and the change that you talked about this morning which you attributed to a change in behavior as the result of the recent drought.
A I am not in a position to distinguish between the various aspects that cause a change of behavior. ULFT is part of the integrated program as well as the advertising as well as the exterior use of water. I cannot exactly say how it is apportioned within them.
Q Is it correct, though, that any change in behavior,

any change in water use attributable to this drought effect would not have been reflected in the demand estimate in the 1990 plan?
A Yes.
Q In light of this development, does it remain your view that LADWP's demand for water in 2010 will be about 756,000

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acre-feet annually?
A It is my view that any number is speculative at this time. The events you talked about appear to reduce demands. There are other factors that could cause things to increase beyond where we projected in 1990.
Q Is there any factor that would lead to an increase besides population growth?
A Yes.
Q What factors are those?
A There are several factors. One is population density. In the last few years in Los Angeles, we have seen a single family home replaced with a number of families living in that home, and so you get more people in the same space. It may be related to population.
Secondly, we are seeing changes in the industrial climate. For example, the refiners are coming to us and saying they're going to be using twice as much water in the near future for the reformulated gasolines for their cooling water. We are seeing some fairly large expansions proposed for other industrial uses which at the moment is a very small portion of our water use, but those certainly were not taken into account in 1990.
Q I understand that we are talking about speculation in these projections for the future, but in this proceeding we are looking for a recommendation that will help the Board in

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making its decision.
Is it your recommendation, or does it remain your recommendation to the Board, that the 756,000 acre-feet demand figure for 2010 is the one that the Board should be using in making its decision?
A That's as valid as any number we presented at this point in time. I am not saying it is accurate. I am saying it is as valid as I can present until I have new data.
Q Are we to infer, then, that whatever water demand savings we will be seeing as the result of these very aggressive conservation measures will be fully offset by population density and industrial use in the future?
A Not necessarily. It could go either way.
Q Do you have any estimates of the amount of water conservation that we can expect as a result of the pricing structure that was put into place in February of this year?
A My personal belief will differ from most of my economist friends in that the water pricing structure complements the rest of my programs in achieving an overall goal more so than the price by itself makes a major change in the water use.
I would contend, if we look at the increase in the bill over the last six or seven years, when you add the sewer charge, which is charged as a piece of the water to the bill, because we are paying a sewer charge and water charge for

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every billing of the water they use, and it's gone up five times in the last decade, that merely changing a piece of it that affects 15 percent of the water in an of itself doesn't.
It reinforces an overall program, but I don't think that it in and of itself necessarily makes a major change in customer use of water.
Q Let me make sure I understand your testimony. Your testimony is that the pricing structure which was implemented in February cannot be expected to have an effect independent of your other programs on water conservation within the Los Angeles DWP service area?
A It will have some effect, but it certainly is not one that I can isolate at this point in time and say, yes, this much of it comes from this one thing.
Q In adopting the rate structure, did the City or some organ of the City, use an estimate with regard to the impact of the rate structure on the water demands within the service area?
A No, we did not.
Q Do you have any estimate of the water savings which might accrue from the residential ULFT program in 2010?
A We again have a lot of uncertainties in terms of how long it runs. For example, the best management practices actually only calls for ten years implementation time, until 2002. I have no reason to believe we are going to

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discontinue the program. We are not committed to doing it necessarily forever. I am also not sure in two other areas of how much water is achieved.
Right now we are reporting results on a certain portion of the population. All the studies that have been done have been either in my program or Santa Monica's program. There are two things. One is the mix in the future. Is it going to be the same mix? We achieve a lot more savings from the apartment-type use than we do from the single family home. How is that mix going to change? Right now we are getting most of the toilets in the apartments, so that could change some of the numbers.
Also one other area we have not been able to investigate is, what is the impact of short-term savings of replacing leaky internal parts of the toilets versus the tank size of the toilet.
If we accept the data and say, yes, with respect to what it will be in the future, you are looking at something in the neighborhood of 3,000 acre-feet in the future.
Q I appreciate all the uncertainties involved in trying to predict the future, but predicting the future is part of what we are trying to do here, so let me ask you the question this way. Do you have any recommendation for this Board about what kind of water conservation it should expect in the future? That is what we are trying to accomplish here, is

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decide what Los Angeles needs. That is part of what is at issue here.
Do you have a recommendation at all, do you have a recommendation for what is a reasonable expectation of water conservation down the road. given all of the uncertainties we are talking about?
A I believe that we will be very effective in terms of our water conservation programs. I think it is safe to say that they will reduce the long-term water use, but it will be very difficult to put a meaningful number on that amount until we have more data behind us.
Q Are you familiar with the assumptions and methodologies prepared by the California Urban Water Conservation Council?
A Yes, I am.
Q And isn't it correct that they have come up with some methodology for predicting savings from various programs?
A The only one they have really quantified is the ULFT and the residential market.
Q Do you agree with that methodology?
A With the provision that I am not certain about the mix of future toilets, and I am not sure what portion of that may evaporate in terms of leakage in the future.
Q With that qualification, would you support a calculation of future savings based on that methodology?

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A Yes.
Q I would like to ask a couple of questions about your Exhibit 87 introduced this afternoon just for clarification. In the first column under Transition Period, my understanding is that the figures there in acre-feet are the total over 16 years; is that correct?
A That is correct.
Q So, then, on an annual basis over 16 years under the LADWP Management Plan scenario, we are looking at roughly, this is my back-of-the-envelope calculation, roughly 20,000 acre-feet annually.
A That is correct.
Q That would go down the streams, and that would be an annual cost of about 6 million dollars; is that correct?
A That is in the right range.
Q And then turning to the 6390 minimum Mono Lake level, that would be about, again a rough calculation over the 16 years, an annual amount of water of about 60,000 acre-feet?
A That is right.
Q And the annual cost, then, under these calculations would be about 21 million; is that correct?
A That would be correct.
MS. KOEHLER: Those are all the question I have for

now. Thank you.
MR. DEL PIERO: Thank you very much. Ms. Scoonover.

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CROSS-EXAMINATION
by MS. SCOONOVER:
Q Good afternoon. My name is Mary Scoonover, and I represent the Department of Parks and Recreation and the State Lands Commission, and I have just a couple of quick questions for you.
You spoke earlier this morning about the conjunctive use program this year whereby the Department of Water and Power purchased water from MWD and stored it in its groundwater basin. Do you recall that testimony?
A Yes, I do.
Q Can you tell me how much the Department of Water and Power paid per acre-foot for this water from Metropolitan?
A It was 192 dollars per acre-foot, as I recall, if I recall correctly.
Q I would like to turn now to the conversation you had earlier with Board Member Forster in which she asked you about your understanding of AB 444, and you explained that one of the prerequisites to the Department of Water and Power receiving money under AB 444 was settling all the issues. Do you recall that testimony?
A I do recall that this morning.
Q Can you explain what you mean by settling all the issues?
A A more precise statement would be that it required a

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mutual application by the Department and Mono Lake Committee to go forward, and so in that sense we had to come to agreement on those issues that the two of us have, which is the thrust of why we are here.
Q Do you know if AB 444 in any way limited the number of applications for projects that the Department of Water and Power could submit?
A I am not familiar enough with it to give you an answer.
MS. SCOONOVER: Thank you. That's all the questions I have.
MR. DEL PIERO: Thank you very much. Anyone else? Mr. Frink.

EXAMINATION
by MR. FRINK:
Q Mr. Gewe, I have a few questions. I was interested in your discussion of the cost of changes in the rate structure which LADWP has used to promote water conservation. Did the Department of Water and Power's gross revenues in water sales increase as a result of the change in rate structure that you mentioned in your testimony?
A That is a difficult question to answer straightforward. Basic revenues coming to the Department, not counting what we paid for purchased water, remain constant under the designed structure. 277 million dollars

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was a guaranteed level of income. The rates had a provision to adjust up or down. If more money came in, the rates went down. If less came in, they went up.
Q So the intent was not to increase revenues as a result of the change in the rate structure?
A That was a political necessity, to get it instituted.
Q Do you know if within the various groups of water users served by the Department of Water and Power, if any particular group had an increase in the rate that they were paying for water?
A The large residential user and the commercial and industrial users that used a high amount of water in the summer versus the winter saw substantial increases.
Q And how did the change in rate structure affect the small residential users?
A By and large, the small residential users saved four or five dollars a month.
Q Now, your testimony described a pretty impressive water conservation program. Did the DWP prepare an environmental impact report on the impact of implementing that program?
A No.
Q Did it prepare any type of CEQA documentation for the water conservation program?
A No.

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Q Columns 1 and 3 of DWP Exhibit 87 referred to the average number of acre-feet per year that would be released in excess of fish flows. How was the quantity of water needed to meet fish flows determined?
A Let me refer that one to Bill, if I may.
MR. HASENCAMP: A Would you repeat the question?
Q I wondered how the quantity of water that was needed to meet fish flows was determined for purposes of Exhibit 87?
A Well, for the LADWP Management Plan, there are minimum flows on Rush Creek and Lee Vining Creek, and no diversions for export from Parker Creek and Walker Creek. So, the fish flows would be 25 cfs April through September, and 15 cfs October through March for Lee Vining Creek, and 33 cfs April through September and 20 cfs October through March for Rush Creek with periodic flushing flows every other year.
Q Do you recall offhand what the total quantity of water was that was assumed to be needed to meet the fish flows as proposed in the Mono Lake Management Plan?
A I can tell you what the export would be under that scenario.
Q Okay, and is it 45,400 acre-feet?
A No, it is 59,000 would be export. The basin runoff averages 120,000 acre-feet per year, so the 120,000 minus the 59,000 would be released.
Q Mr. Gewe, I believe you testified about the potential

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hardship on low income residents from the increase in water costs. Could you briefly describe the current rate structure within the City of Los Angeles?
A The current rate structure in the City of Los Angeles is a two-block ascending rate structure. For water use up to twice the median usage, which is 4400 cubic feet for two months during the winter and 5800 cubic feet for the two months during the summer, is at the low block. Currently that price is about one dollar sixty-five per hundred cubic feet. Water used in excess of those amounts is billed based on a marginal cost which during the summer is two dollars ninety-eight cents per hundred cubic feet and two dollars thirty-three cents per hundred cubic feet during the winter.
Q How much was it in the winter again, sir?
A Two dollars thirty-three cents.
Q Any sort of base level of water usage that the user simply pays a flat rate for that is not dependent upon the quantity of water used?
A No, the major change of structure was to do away with the service fee, and all of our income is based on commodity sales only.
Q And the effect of changing the rate structure in that way was actually to reduce the cost of water for the small residential user; is that correct?
A That is correct, because in the past they paid a fixed

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fee whether or not they used water. That has been eliminated.
Q Does the City of Los Angeles have any plans to implement any sort of lifeline rate for very low income water users?
A Instead of having a rate, we have a lifeline and a low income credit which is applied to the water use. Ten dollars a month is applied for the senior citizen with limited income, five dollars a month plus an additional one dollar for each person in the household over three to a maximum of ten dollars a month is applied to the bill of non-senior citizens with limited income.
Q What is the average monthly bill of a small residential water user that does not exceed that initial rate that you described earlier?
A The median user, again I don't know how we define small, but the median user pays about 25 dollars a month.
MR. FRINK: All right, I believe that's all I have. Thank you.
MR. DEL PIERO: Mr. Satkowski.

EXAMINATION
by MR. SATKOWSKI:
Q Good afternoon. I have a few questions. The first one deals with Figure 1 of your exhibit, Mr. Gewe, the actual and projected water use. And it goes out to the year 2010.

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In your projections, you have a plus or minus 8 percent. I

think you answered earlier that that was weather factors; is that correct?
A That is correct. That would be the range of change in demand in a given year for a very wet year versus a very dry, hot year.
Q Do you happen to know what projection was used in L. A.'s water supply analysis that was produced by Mr. Wade a couple of weeks ago? Was it the average year or with a plus or minus 8 percent?
A I'm not sure.
Q Mr. Hasencamp, do you know?
MR. HASENCAMP: A No.
Q Turning the page to Table A, which is expenditure for water conservation demand side management programs. The first column is the fiscal year. What months does that include?
MR. GEWE: A We are on a July through June fiscal year.
Q And this table starts with fiscal year 1988 through 1989. Did you have a significant expenditure for water conservation before that date?
A They would have been much smaller. They would have been there, but probably in the order of magnitude of half a million dollars.
Q Now, turning to page 89 of your testimony, on the

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first full paragraph, the last sentence, it states: The Los Angeles/West Basin Project will result in 70,000 acre-feet of recycled water, most of which will be used outside Los Angeles.
My first question is, how did the 70,000 relate to the 80,000 acre-feet of reclamation which was proposed to be reclaimed by the year 2010?
A Only that small portion, say 1,000 to 2,000 acre-feet that would be used inside of Los Angeles would be a portion of the 80,000. The remainder is external to DWP's operations.
Q Now, the 70,000 mentioned here, is that water that is derived from inside the Los Angeles city limits and is going to be used outside the city limits?
A It is the sewage effluent from inside that will be treated and used outside the city limits.
Q Why is that happening? Why isn't L. A. using this water inside the city limits?
A It has to do largely with economics. L. A. has two treatment plants where we are already treating the water to tertiary standards that we are not using beneficially. We are going to focus on using that water beneficially before looking to do additional treatment.
Q Moving on to page 90, in the first full paragraph you mention that actual implementation will take longer than

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originally expected.
Are your latest estimates for reclamation to the year 2010 contained in Table 3L-C of your comments to the Draft EIR?
A The 2010 numbers would be valid. The numbers early on have again fallen since that was prepared, or slipped since that was prepared.
Q Would it be even less than that?
A In the intervening next two years, it is going to take longer than what I had assumed last July or September when we prepared those comments.
Q Have you seen the projected reclaimed water use figures that were contained in the EIR?
A I saw them at the time I reviewed it, but I would not be able to recall them today.
Q Let me give you a copy of those. You have before you Table 3L-3 out of the EIR, and also Table 3L-C out your comments to the EIR. As you can see, going through the year, say, 2000, the EIR estimates are for about 82,000 acre-feet reclaimed while the L. A. estimates are about 35,200 acre-feet. Why this difference?
A Reality, I suppose. As we have moved toward the project, we found them much more difficult to implement than what we had expected as we first started in the throes of the drought. The largest single factor that we have in our

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project is the San Fernando groundwater, or the East L. A. recharged project.
The types of problems we have run into just in terms of getting the modeling study done -- We have an application into the regional board at this point in time, and their staff is reviewing it and coming up with a number of additional studies being required before they will consider issuing the permit for the project. A great deal of testing is required. So we have found the reality check is that all these are taking much, much longer than we had thought. I feel fairly convinced that we are going to get to them within the time frame of 2010, but we are not making the speed of progress we had assumed when we were in the middle of the ground.
Q You stated earlier that Table 3L-C, I guess, should be revised, or the numbers should now be different than what's shown on this table. Do you have a revised table that you could provide us showing what you think are the current reclamation values for specific years?
A I don't have it with me, but we could certainly provide you with that.
Q That would certainly be useful. Thank you. One more question dealing with the National Audubon and Mono Lake Committee Exhibit 223, which was the bond prospectus. On page 36 of that exhibit is a table showing the comparison of

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water supplies and demand. Do you have this in front of you?
A Yes.
Q The fourth row down, well, under probable increases in supplies, it shows reclaimed water there for the year 1995, 2000, 2010, 0.04 million acre-feet, 0.19, and 0.27, do you see those figures?
A Yes, I do.
Q Would you say those are the current reclamation figures that you were talking about earlier?
A Again, these numbers, of course, are referring to all of MWD, not just the City of Los Angeles. My numbers, and probably more optimistic numbers, of about last July may well be in here as a piece of this, but that again is all Southern California, not Los Angeles.
Q The estimates of reclaimed water in the future, the year 2010, is only 270,000 acre-feet?
A That is correct. That's MWD's best estimate based on information they have been given by the agencies.
MR. SATKOWSKI: Thank you.
MR. DEL PIERO: Mr. Smith.
EXAMINATION
by MR. SMITH:
Q A question to you, Mr. Gewe. A very common comparison is the gallons that a family uses typically per day. Correct me if I am mistaken, Mr. Del Piero, Monterey County was

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something like over a hundred.
MR. DEL PIERO: It's 250 today for a family of four.
MR. SMITH: There's over 200 here in Sacramento as indicated in some of the testimony in the Bay-Delta hearings. How much in the way of gallons does a typical family use in Los Angeles?
A Let me give you a number that is similar, but not exactly what you asked for. Total use by the City divided by the population pre-drought, we were running in the range of 180. Today we are down at 152 or 155 as a result of the habits and the change in the last two years.
MR. SMITH: Thank you.
MR. DEL PIERO: Does that include industrial and commercial?
A It does include commercial. Industrial is roughly 3 to 4 percent, and commercial is another 10 or 12 percent. So the predominance is residential, and again, that is the total supply divided by the total population.
MR. DEL PIERO: Mr. Canaday.
EXAMINATION
by MR. CANADAY:
Q This is a question that Board Member Brown asked of a previous panel and wasn't able to get an answer. and they kind of referred us to you, so I'm going go ask the question for Mr. Brown.

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Do you know the amount of power generated in the aqueduct system with an acre-foot of water from Crowley Lake to the City of Los Angeles?
A We have an exhibit somewhere behind us here, I assume.
MR. HASENCAMP: A We have an exhibit. It's in this

room here.
MR. DEL PIERO: Sometimes it is better to let the guy who put it away find it.
MR. BIRMINGHAM: Perhaps we could have this marked LADWP next in order, which I believe would be 88.
MR. DEL PIERO: Do you have copies of this?
MR. BIRMINGHAM: Yes, I do have copies for everyone.
MR. DEL PIERO: Mr. Canaday.
MR. CANADAY: Q Do you want me to repeat the question?
MR. HASENCAMP: Yes.
Q Do you know what the acre-foot going from Crowley Lake to the City of Los Angeles generates, how much electricity it generates?
A Yes. There are a number of factors involved, depending, of course, on which of the aqueduct is used, etc., but the typical average is 3,560 kilowatt hours per each acre-foot.
Q Now, I am on my question. That was Mr. Brown's time. Mr. Gewe, in your testimony you talked about the unit

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cost for operating the aqueduct system, and you talked about various costs. You said they varied considerably in the last five years, and you said they ranged from 144 dollars an acre-foot to 499 dollars per acre-foot, and your testimony said the variation resulted from large swings in the amount of water delivered. Can you explain that?
I am trying to understand how that --
MR. GEWE: A Certainly. The aqueduct system has a capacity of as high as 470,000 acre-feet, maybe a little bit above that, that we can deliver with no change of facilities.
On the other hand, in the middle of the drought, we were only delivering a little over 100,000 acre-feet of water, so for the same expenses, if you divide by a hundred or by five hundred, it makes a vast difference in the net resulting average cost.
Q Further in your testimony you identified a number that the Department established as an upper limit of 750,000 acre-feet as a planning horizon for the distribution costs of its proposed water recycling program. Are you aware of what other kinds of costs or other local districts in their planning horizon costs would be?
A Obviously, the numbers vary dramatically. Bill Mills recently put out a number of 400 dollars per acre-foot to a thousand dollars an acre-foot he saw as viable for reclaimed water projects. The City of Glendale, in their most

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expensive reclaimed water project, is looking at 1100 dollars an acre-foot.
Q In your testimony you described that under your ultra low flush toilet program that you replaced approximately 330,000 units. What percentage is that of the possible replacement?
A We don't have an inventory of toilets. Our best guess is that there's somewhere in the 2-plus million toilets in the City of Los Angeles. So that number would be something like 7 percent or 8 percent, if my arithmetic is right -- No, 15 percent.
Q So, for 15 percent replacement you've got a 2 percent decrease in demand?
A Yes. Whether the percentage would hold up totally as you go out, I don't know. We may be getting dedicated users who may be more efficient than others.
Q Further in your testimony you stated that LADWP had signed the MOU regarding the urban water conservation in California, and you said Los Angeles DWP has implemented 15 out of the 16 best management practices. Which one hasn't been implemented yet?
A We have not implemented a plan check review for commercial and industrial projects.
Q And what would that entail? Can you describe that?
A What that entails is taking plans when they are

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submitted for construction of some industrial project and reviewing those plans and providing recommendations to the architect on ways that they can use less water in that particular project.
Q You testified earlier that some industrial users are coming back to you saying they are going to need maybe twice as much water; is that correct?
A That is correct.
Q And so this is one area that you are not doing these plan reviews yet; is that correct?
A That is correct.
Q So, if 16 out of 16 were implemented, this could be a significant savings, then?
A There could be a savings in the order of magnitude since industrial customers only use 3 to 4 percent of the total water of the City of Los Angeles, so it is not going to be major in the total picture.
But when we are talking in the magnitude of a difference between alternatives of 8,000 acre-feet and 15,000 acre-feet, that could make a difference; correct?
A That is correct.
Q Earlier you described, I guess you'd call it, the block rate structure?
A Yes.
Q And in the second tier, or second block, your

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testimony describes that that particular rate has provisions for financing water conservation and water recycling programs?
A Not quite. The provision for financing this program is actually in the lower tier.
Q And what kind of revenue does that generate?
A The revenue generated is up to about 45 million dollars a year, depending on how much water we sell or the possible rate. We are not generating that much at the moment because we have not been able to physically do the recycling program to spend the money, but that's the potential collection.
Q So, that money would augment other types of income for water recycling that you described later on in your testimony from HR 429 and some of the MWD cost sharing projects; is that correct?
A That is correct.
Q My understanding is that some of the recycled water currently is projected to be used out of the Los Angeles service area; is that correct?
A That is correct.
Q So, if it is used out of that area, you are marketing water out of the Los Angeles service area?
A I guess you could call it wholesaling an unfinished product to somebody else who is treating and selling it

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outside the area.
Q And you also said that some of that recycled water was used in the Los Angeles River. Could you explain that particular program?
A Currently, both the Donald C. Tillman and San Fernando Valley and the Los Angeles-Glendale Treatment Plant treat the water to the tertiary level standard, and that water is released into the Los Angeles River and flows to the ocean.
The river itself has developed a series of proponent enthusiasts that would no longer allow us to take the full output of those plants and divert it for other uses. There is a strong constituency saying, we must maintain flows in the river.
MR. DEL PIERO: Is that in the concreted portion of the river?
A It goes through both, concrete and open bottom, that are intermittent throughout the basin, so it flows through both.
MR. CANADAY: Q Would it be safe to say that some of that water that is being recycled comes from the Los Angeles Aqueduct system?
A Yes.
Q So, would it be safe to say some of that water was water diverted out of the Mono Lake Basin?

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A Up until four years ago.
Q But assuming that a decision by this Board allows some diversion from the Mono Basin, that water that is being diverted through the Los Angeles Aqueduct system is being recycled to accommodate the wishes of the citizens of your service area for maintaining flows in the Los Angeles; is that correct?
A That would be correct.
Q And water being recycled and, in a sense, wholesaled

out of Los Angeles service area is also water coming through the Los Angeles Aqueduct system as well; is that correct?
A That is correct.
Q What is that amount of water that is being wholesaled out of the Los Angeles water service area?
A To date it is zero.
Q What was it five years ago?
A Zero.
Q What will it be, what percentage of it, what is your estimated sales?
A In 1995 it is projected that up to 20,000 acre-feet a year could be wholesaled out of the Los Angeles region and ultimately a plan of 70,000 acre-feet is what's reported in our documents here at some undetermined time frame in the future.
Q You talked about institutional problems of bringing on

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line reclamation and recycling projects. Now, the process that the Department goes through is a planning process or a triage of what are the most benefit/cost-effective projects to implement and prioritize; is that correct?
A That is correct.
Q Then the Department decides when it makes its decision based on these kinds of analyses, and it decides which project to pursue, it is, in fact, the lead agency for that project, the implementer of that project; is that correct?
A That is correct.
Q And by being a lead agency then they must comply with CEQA; is that correct?
A That is correct.
Q All right, like Ms. Forster likes to simplify numbers and play with numbers, so I would like to refer first of all to Figure 2 in your testimony, and based on your fiscal year from June 1992 to June 1993, or July 1993, is it your opinion that the conservation that was accrued by the users of water that year was roughly 20 percent, at least 20 percent?
A That is correct.
Q And do you recall exactly what the projected demand was for that year?
A I recall what the actual demand is.
Q The actual demand?
A 595,000.

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Q Call it 600,000. So, 20 percent of 600,000 would be roughly 120,000 acre-feet; is that correct?
A Yes.
Q And I believe under Table A for that time period, the 90 fiscal year 92, 93, your expenditure for water conservation demand side management programs was about 7.7 million dollars, is that correct?
A That is correct.
Q Well, if you divide 120,000 acre-feet savings by 7.75 million dollars, you get the per-acre cost of about 64, exactly 64 dollars and 54 cents. It seems to me that if you can generate those kinds of costs that that is probably where your best bet is for spending money) wouldn't you say?
A The mathematics is correct. I'm not certain the analysis is valid because that expenditure in and of itself did not generate the savings. That expenditure was largely for toilets which generated a small percentage of that savings. What you are seeing is the buildup of all those previous years coming into play, the advertising, the toilets were replaced two and three years ahead of time, industrial work, all of them coming together to achieve that, but it is a cumulative effect, not a single year versus total use water demand.
Q Earlier you talked about substantial use areas within the district. Is South Central L. A. one of your substantial

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use areas?
A We haven't really chosen to accumulate data by use areas because it gets us into political problems, but I would say in general it is certainly not the highest volume user.
MR. DEL PIERO: Excuse me, what does that mean?
A That means when we get one councilman playing against another, you don't want to say exactly what the numbers are in these districts.
MR. DEL PIERO: Do you know the numbers?
A That's why we don't accumulate the numbers, because we don't want to get into having to answer those questions.
MR. CANADAY: Q I have one last question. Do you happen to know what the total annual budget for the Department of Water and Power is?
A The anticipated water system income for the fiscal year that we are just concluding is 422 million dollars. That is not the whole Department. The power side is much larger.
Q And that figure was again?
A 422 million dollars is what we set our rate initially to recover.
MR. CANADAY: Thank you.
MR. DEL PIERO: Okay. Mr. Birmingham, redirect.
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00140

REDIRECT EXAMINATION
by MR. BIRMINGHAM:
Q First, let me just ask a couple of questions about LADWP Exhibit 88. Who is responsible for the preparation of that exhibit?
MR. HASENCAMP: A I was.
Q And some of the information that's contained in LADWP Exhibit 88 is information responsive to a question asked by Mr. Canaday, and that was the number of kilowatt hours produced on average per acre-foot of water conveyed through the L.A. Aqueduct. There is additional information on LADWP Exhibit 88 that relates to energy required to deliver MWD water to L.A. Can you please tell me, Mr. Hasencamp, where you included that information on the exhibit?
A Well, for every acre-foot of water that is not brought from Mono Basin that has to be purchased from MWD, there is a substantial energy requirement to provide that water to L. A. From the State Water Project, the net generation, or the net energy required, is 2960 kilowatt hours per acre-foot, and from the Colorado River Aqueduct it is 2000 kilowatt hours per acre-foot.
Q Why did you decide to include that information on this exhibit? Was it in response to a question that was asked by Board Member Brown?
A Yes.

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Q Mr. Gewe, Ms. Koehler asked you a number of questions about the conservation practices of the City of L. A. and the Department of Water and Power, and I am not sure I understand all of the acronyms she used, but she used acronyms BMP and MOU and ULFT. The MOU is the Memorandum of Understanding; is that correct?
MR. GEWE: A That is correct.
Q Who signed the MOU?
A The MOU is a document that came out of the Bay-Delta process whereby the water agencies and the environmental community got together to establish a set of practices that could be implemented, and to come up with reasonable numbers of what those practices would accomplish. I believe almost 160 water agencies, or maybe it's a combination of water agencies and environmental organizations -- I'm not sure, but a large number of water agencies as well as a large number of the environmental communities have signed off on that document.
Q That Memorandum of Understanding identifies best management practices that the signatories have agreed to implement?
A The essence of the MOU is that the signatories agree to implement the measures, the environmental community agrees to use reasonable, responsible estimates of what could be accomplished with those measures, so we have agreed that we

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will implement these measures.
Q And one of the best management practices was a program to retrofit ultra low flush toilets; is that correct?
A That is correct.
Q And Ms. Koehler asked you a question about SB 1224. That is a State statute that requires that by a particular time all toilets in California that are sold are to be ultra low flush toilets) is that correct?
A That is correct.
Q Now, this best management practice of retrofitting ultra low flush toilets, was that something the City of Los Angeles was undertaking before it signed the MOU?
A Yes, it was.

Q And was the genesis of this best management practice in the Memorandum of Understanding based upon the program developed by the City of Los Angeles?
A The measurement of the effectiveness of it was based upon our program. I'm not sure that the BMP was.
Q Is the same true with respect to the enactment of SB 1224?
A The City of Los Angeles had enacted a similar measure earlier than SB 1224, again not necessarily directly related.
Q Mr. Canaday asked you some questions about the use of reclaimed water. He asked you if it wasn't correct that water diverted to Los Angeles via the Los Angeles Aqueduct

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would be recycled and then put down the Los Angeles River. Do you recall that question?
A Yes, I do.
Q The water that's diverted from the Los Angeles Aqueduct system or diverted to Los Angeles via the aqueduct system before it is recycled, is that water put to a beneficial use?
A It certainly is.
Q And is allowing water to flow down a short stretch of stream to a saline body a beneficial use of water?
A Many people would believe so.
Q Does the water flowing in the Los Angeles Aqueduct provide habitat for wildlife in Los Angeles?
MR. THOMAS: Objection. The gentleman is not qualified to discuss habitat for wildlife.
MR. DEL PIERO: I am going to sustain the objection.
MR. BIRMINGHAM: Q The water that is recycled and the Department proposes to be wholesaled outside the service area, is that water put to a beneficial use before it is recycled?
A Yes, it is.
Q Mr. Flinn asked you a question about the cost, and it was based on your Figure A -- He asked you a question about the expenditure for water conservation programs in 1990-91, and he calculated that when compared to the conservation that

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occurred during that same period, the average cost per acre-foot of a conservation program was approximately 150 dollars per acre-foot. Do you recall that question?
A Yes, I do.
Q Is it reasonable to quantify the per-acre cost of water using that method?
A Using the method of taking gross savings divided by gross dollars, I would say no. As I mentioned to Mr. Canaday's comment, it is certainly possible to come up with cost measures on individual, specific programs.
Q Would you explain why you hold that opinion?
A I can determine the cost of water saved by the ULFT program. I know how much money I am spending on the toilets, and by using this statistical analysis, know how much water has been saved by that, and I can come up with a dollar per acre-foot. Various people can come up with different answers, depending on the assumptions you have made as to the life of that toilet, how long is the water saved, how long does it stay in place, but you can't come up with a number associated with any specific activity.
On the other hand, other BMPs such as conducting school education programs, I spent a couple of hundred thousand dollars providing information to classrooms. It's impossible to determine how much savings I get specifically from that program. So, again it depends on the nature of the

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program as to how well you can quantify it.
MR. BIRMINGHAM: I don't have any further questions at this time.
MR. DEL PIERO: Thank you very much, Mr. Birmingham. We are going to take a break right now. Ms. Forster has a meeting, so it is a natural breaking point, and we will be back right around 3:00 o'clock.
(Recess.)
MR. DEL PIERO: Let's begin again. Mr. Flinn.
MR. FLINN: Mr. Dodge had a question he wanted to raise.
MR. DEL PIERO: Mr. Dodge, do you have a question you want to raise?
MR. DODGE: I have a witness who is leaving the country and --
MR. DEL PIERO: Probably wise on her part.
(Laughter.)
MR. DODGE: Her name is Stacy Simon, and she will give what I think is quite brief testimony. She leads the canoe trips out at Mono Lake around the tufa, etc. We would like to put her on after lunch on the 7th. We would be interrupting --
MR. DEL PIERO: The 7th is Tuesday.
MR. DODGE: We would be interrupting the DFG.
MR. DEL PIERO: Ms. Cahill.

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MS. CAHILL: My only problem is in my Rush and Lee Vining study panel of six people on Tuesday. One of those six has a problem Tuesday night and if putting somebody on after lunch ran into Tuesday night, I might have a problem.
MR. DEL PIERO: Well, Tuesday night we may not be doing any business here anyway because I may have to go visit the Governor. I got notified of that at lunchtime, so all my best plans seem to be not necessarily working out the way I would like.
So, can she be here on Monday, your witness?
MR. DODGE: I don't know the answer to that. We would be happy to put her on after lunch on Monday.
MR. DEL PIERO: You were not going to start your witnesses until Monday; right?
MS. CAHILL: That is right.
MR. DEL PIERO: Do you mind if we put her on before you begin your case in chief?
MS. CAHILL: No.
MR. DODGE: She is from Lee Vining.
MR. FRINK: You said she is from Lee Vining? In the event things go quickly --
MR. DODGE: I have just made a mistake. She's been described to me as a transient. I don't know whether that's going to prejudice her or not.
MR. DEL PIERO: I knew there was a reason I was

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looking forward to your witnesses. (Laughter.)
MR. DODGE: I think we could start with her Monday morning.
MR. DEL PIERO: Good, 8:30 Monday morning. Ms. Cahill, you won't have a problem of being interrupted in the middle of your panel.
Mr. Flinn.

RECROSS EXAMINATION

by MR. FLINN:
Q This is for Mr. Hasencamp. I put up what we will mark at some point as our comparison chart, the L. A. Management Plan and Alternatives.
There was some confusion in some of the testimony you gave. I don't recall who it was. but you mentioned, I think it was a question by Mr. Frink with regard to fish flows and what exports would be allowed under the fish flows. Do you recall that?
MR. HASENCAMP: A Yes.
Q 59,000 acre-feet of exports above the fish flows; is that right?
A 59,000 would be exported from the Mono Basin with the minimum fish flows in the DWP Management Plan.
Q But looking up at the chart, the 45,700 is what would be exported under the Management Plan. including the protection of the lake level provided by the Management Plan:

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is that right?
A Well, my testimony says 46,300, but that's close.
Q So, it would be potentially more exports than are provided for up in that chart then; is that right?
A Yes.
Q And then looking at the 6390 and 6410 alternatives, if one were to compare the exports of those alternatives to the L. A. Management Plan, you would subtract 37,000 from the 46,300, and 22,000 from the 46,300 to get the differences; is that right?
A No.
Q Why is that not right?
A The DWP Management Plan was run with a certain set of operational criteria. The 6390 lake level alternative that you have up there was run, if it is from the Draft EIR, was run from a different set of operational criteria with some errors in the model that are being corrected as we speak.

And so it is not right to compare the two outputs. It's an apples and oranges comparison.
Q When you say operational parameters, they are being operated to target different lake levels; right?
A Yes, but for 6390 under the DEIR, water is exported out of Mono Basin when there is no capacity in the aqueduct for that water and it is spilled into Owens Lake and does not make it to L. A.

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Q Assuming that what you describe as operational changes are made in the model to correct those mistakes, and assuming that they don't result in any substantial change in the amount of exports, then such a comparison would be valid, and these would be good numbers. is that right?
A Well, actually, I don't think so because we have run our model with the 6390 alternative and the L. A. Management Plan alternative, and our difference is 14,000 acre-feet.
Q And that is in your testimony?
A No.
Q That's in the documents that we have been provided, then?
A I'm not positive of that.
Q Well, we will want to get those, but I will move on. Mr. Gewe, I was interested in some of the answers you gave to Ms. Koehler's questions. I will put this back on for a second. Ms. Koehler was asking you, couldn't your demand projections go down because of the conservation efforts that aren't accounted for in the 91 plan, and you said, generally, and then you made it more specific, yes, they might come down, but certain factors compensate and get them back up again, so factoring that in you would just as soon stick with the 756.5. Do you recall that testimony?
MR. GEWE: A Yes, I do.
Q I was trying to write down the factors that would

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account to get us back up. I'm trying to recall. I want to recall where we are starting from to get back up. In 92 and 93, when the drought was over, we are still seeing a 20 percent conservation savings, and so we have 20 percent, approximately, over 100,000 acre-feet of water to make up by these compensating balances, and the two things that I wrote down from your testimony were (1) increased density, people living closer together, and (2) industrial use, particularly refineries making better gasoline. Did I miss some, or were those the two that you identified?
A Those are the two I identified. One item I neglected to put in there again is rebound from the drought habit which may well occur, but may not.
Q Okay, let's talk about that industrial group. Now, in questions from Mr. Del Piero, you testified as to what percent of the L. A. water supply is used by industry.
A That is correct.
Q What is that percent?
A Between 3 and 4 percent.
Q Between 3 and 4 percent. Now, would this increase in industrial demand, that only comprises 3 to 4 percent of the water supply, eat up all of our 120,000 acre-feet of savings?
A Certainly not all of it.
Q Half of it?
A Certainly not half of it.

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Q A tenth of it?
A Possibly.
Q Now, let's talk about where are these plants, these refineries, physically located? Can you find them on our map here of the County of Los Angeles?
A The refineries tend to be down in the Wilmington and San Pedro area, over in this general area down towards Long Beach.
Q Near the Terminal Island water recycling plant?
A That is correct.
Q And generally in the area pretty much dominated by some of our blue lines there; is that right?
A Probably not quite as far over as most of the blue lines, but yes.
Q Now, isn't this kind of industrial use, cooling for refineries, an ideal use of reclaimed water?
A Yes, it is.
Q And it doesn't have to be potable water for this cooling activity; does it?
A That is correct.
Q So, for our other 70,000 acre-feet of nonpotable water, this could be an ideal way to use that additional recycled water; is that right?
A That is correct. If I could amplify that, also that would be included in the total quantity of water increases.

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It's a displacement, but whether it is reclaimed water or fresh water, it is total supply.
Q But we wouldn't have to worry about supplying potable water for that particular use?
A That is correct. In fact, the oil companies are very interested in using reclaimed water.
Q Now, let's talk about density. Were you relying on some particular demographic study of how people are going to be living in houses in 1995 to 2000 if they are not living between 1990 and 1992?
A I do not have any specific study to reference. It's more of a general impression from the types of information presented in the news media, etc.
Q Is it simply single family houses with lawn that people are tearing down and building apartments, or is this a single family house with a lot more people living in it?
A We are seeing both, but considerably more at this point in time of additional families within a given structure.
Q At this particular time you are talking about, say, since 1990?
A That is correct, coincident with the economic bantering.
Q And presumably, to be blunt, if that economy turns around, people will start moving out of their parents' houses

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again?
A That is one possibility.
Q And to the extent that this is caused by more permanent changes, that is, people replacing higher density housing, you tend to eliminate certain landscaping uses when you do that.
A When you do that, you do.
Q As I understand, landscaping is one of the largest, more intensive water uses among residential users in Los Angeles.
A Single family uses.
Q Now, I want to finish and just talk a little bit about this electricity exhibit -- Oh, one more question. I want to talk a little more about some of the blue lines. We talked about geography, and was it something about the geography that put fewer blue lines in the City limits, and you said, well. the treatment plants, some of them are close to the coast. But some of these plants, this one appearing to come from the San Jose Creek plant or the Pomona plant, seem to stop, and certainly the West Basin ones seem to stop at the City line here. Is there a geographic reason for that, some physical reason that those stop at the City boundaries?
A It's probably as much institutional as geographic.
Q You mean those are the boundaries of the particular institution that is doing the project?

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A That is correct.
Q What happened to our electricity -- Now I guess this is probably more for Mr. Hasencamp, but possibly Mr. Gewe. The initial cost of importing MWD water, is that an electric cost that is unique to getting water to Los Angeles, or does MWD incur some or all of those power costs simply by getting the water to the Southern California area?
A Generally it gets to the Southern California area.
Q So, to the extent that MWD doesn't give that water to Los Angeles and they give it to somebody else, somebody is going to be incurring those costs?
A That is correct.
Q Now, looking back up at Mono Lake Committee Exhibit 4, Historical Projected Supplies, I'm looking briefly at the projected supplies going forward, and you read the legend, and if you read the legend, the darker area is the quantities of MWD purchases. Let me ask you to assume hypothetically that that, in fact, is what Los Angeles does in the future with regard to additional water supplies.
You would agree with me that to the extent that you don't use as much MWD water as that model projects, then you

would not incur the additional power costs of bringing in MWD water?
A That's correct. I'm not sure that was the intent of the exhibits, but that's a correct statement.

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MR. FLINN: I'm through. Thank you.
MR. DEL PIERO: Thank you, Mr. Flinn. Ms. Koehler.

RECROSS-EXAMINATION

by MS. KOEHLER:
Q I have just a few questions. My last few questions are directed again toward your Exhibit 87. I would like to make sure I understand exactly what we are being told from this exhibit. I just want to run through a few things so we are all on track.
Is it correct that this exhibit assumes the fish flows which are lower than those recommended by California Department of Fish and Game?
MR. HASENCAMP: A Yes.
Q And the exhibit also assumed that there will be no diversions to L. A. for 16 years in this first column; is that correct?
A The 6390?
Q The Transition Period column.
A Yes, for the 6390 lake level row, yes.
Q Well, that leads to my next question which is, what exactly is it you are assuming in the LADWP Management Plan row. Is this 326,000 the additional water you will take to get water to 6377?
A No. My understanding is there's two issues before the Board at this hearing, and one is the minimum flows to

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maintain the fisheries, and the second is the public trust balancing of the Mono Basin resources. The fourth is to maintain the fisheries. The exports allowed, then, would be 59,000 acre-feet per year. On top of that another about 13,000 acre-feet per year would be required to maintain the lake level under the LADWP Management Plan.
Q And that lake level is about 6377?
A Yes.
Q So, is your response to my question that the 326,000 additional acre-feet are the amount necessary cumulatively over 16 Years to bring the lake to elevation 6377?
A To maintain it at 6377. It would only take a few years to get to 6377, but to maintain at that level.
Q I am looking at the Transition Period column.
A The reason that is there is to compare the two plans. The transition period for the Management Plan is only 1 or 2 years, but so you can compare the total cost over the 16 years.
Q I see, but this is a 16-year cost.
A Yes.
Q So, to go back to my earlier question, these two columns under the Transition Period heading for both the LADWP Management Plan and the second listing of 6390 minimum, they both assume no diversions will go to Los Angeles over that period; is that correct?

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A No.
Q It is only correct for the 6390 minimum?
A Yes.
Q Is it correct that that represents about 60,000 acre-feet on an annual basis? I believe, Mr. Gewe, that you testified to that earlier.
A It represents 67,700.
Q Your math is better than mine. I'm again assuming no diversion whatsoever to Los Angeles over that 16-year period?
A Yes.
Q That is a fairly radical assumption; isn't it?
A Not any of the alternatives in the Draft EIR make that assumption with the exception of the no restriction alternative; is that correct?
A Yes.
Q Would it be a fair characterization that your 6390 minimum is a worst case scenario?
A Well, not necessarily, because there are small amounts of diversions allowed, that would extend the transition period, so the water has to get the lake one way or the other. Whether or not it gets into the lake over a longer period or a shorter period, the water will get to the lake, and if there is a longer period. it will require more water.
Q But if diversions were allowed to go to Los Angeles,

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wouldn't that bring down the cost of replacing Mono Basin water?
A On an annual basis, yes.
Q On an annual basis, so taking this relatively worst case scenario, approximately 67,000 acre-feet annually, the cost to the City of Los Angeles on an annual basis, I believe the testimony earlier was about 21 million dollars. Do you have a more accurate figure for us, Mr. Hasencamp?
A No.
Q Does that sound accurate to you, 21 million dollars -- That's your 344.5 million over 16 years.
A Mr. Gewe is shaking his head, so I will agree.
Q So, bringing this down to the per-person basis, boiling it down as Board Member Forster had requested, and I agree, it is easier to sometimes think of it in bottom-line terms. We're really talking about for the 6390 minimum, something around 7 dollars per person; isn't that correct?
MR. GEWE: A Per year, assuming the cost of that water is the current price of MWD water today.
Q I am using the assumption in your chart. That brings me back to the concerns that were expressed earlier with regard to the poorer residents of the City of Los Angeles. Assuming that 7 dollars per person on an annual basis does represent serious financial hardship to certain residents of the City, isn't it correct that this figure is still an

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average over all of the citizens?
A Yes.
Q We just divided by the total population of the City. Isn't your rate structure to deal with exactly this situation where different consumers can afford and want to use different amounts of water and are charged accordingly?
A Economic status may or may not directly relate to the amount of water use. The rate structure will be based directly on the amount of water used.
Q I'm not trying to make any absolutes, but as a general proposition, would you agree citizens who are somewhat wealthier are also those citizens who are more likely to have lawns and landscaping requiring the extra amount of water that is usually at issue when we are talking about conservation?
A At the extremes, that is very much true. Within the mid range it may not be.
Q In response to a question from Mr. Canaday, I can't remember which one of you responded, that some amount of water from the Mono Basin was used and would be in the future for recreational purposes on the Los Angeles River; is that correct?
MR. GEWE: A That is correct.
Q Do you consider water for this purpose to be a competing public trust use with public trust uses in the Mono

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Basin?
MR. DODGE: Objection, calls for a legal conclusion.
MS. KOEHLER: Let me rephrase.
MR. DEL PIERO: Sustained.
MR. KOEHLER: I withdraw the question.
Q Mr. Gewe, in responding to Mr. Birmingham's recent questions to you, you indicated that Los Angeles had undertaken its ULFT program prior to BMPs, to the best management practices in the urban conservation Memorandum of Understanding. I appreciate that is an acronym, and I will try to use it less.
A That is correct.
Q Isn't it correct, however, that BMP-16 regarding ULFTs in addition to State and federal laws regarding ULFT installation forces a much higher installation rate than contemplated by Los Angeles in its 1990 Urban Water Management Plan?
A That is correct.
Q Isn't it accurate that the 1990 plan contemplates a 20 percent installation rate by 2010?
A That is correct.
Q And we spoke earlier, but I just want to pin this down, about the installation rate, that it is likely now. given the current laws and the current BMPs, -- Isn't that in the range of 88 percent?

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A The BMP again only applies to the next ten years. The actual wording, I believe, is that the rate at which it would be replaced was based upon sale of property. If it did apply to 2010, it would be true. On the other hand, it may be more difficult to reach as we get into those future years.
Q Maybe I am not being clear. I am not suggesting BMP itself suggests a particular or mandates a particular turnover rate. I am suggesting that the assumptions and methodology agreed to by Los Angeles, among other urban water agencies, generate that conclusion.
A If you carry it out beyond the BMP, that is correct.
Q Let's assume for the moment that 88 percent is an accurate installation rate for ULFTs as opposed to 20 percent in the Urban Water Management Plan, wouldn't that force a much higher level of water savings?
A Certainly.
MS. KOEHLER: Thank you. That's the end of my questions.
MR. DEL PIERO: Thank you very much. Ms. Scoonover.

RECROSS EXAMINATION

by MS. SCOONOVER:
Q Mr. Gewe, just a couple more questions on the conjunctive use program of the Department of Water and Power and the Metropolitan Water District. Can you tell me whether or not this was a seasonal storage purchase or was it some

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sort of special purchase?
MR. GEWE: A It was a special purpose made available this year only because of the surplus supplies using the same terms as if it had been a seasonal storage, but seasonal storage only applies to winter use.
Q And did this increase the DWP's groundwater credit in the San Fernando Basin?
A Yes, it did.
Q Can you tell me whether or not this has been recalculated? I believe it was calculated on the first of October.
A There is an account made as of the 1st of October. I do not believe the numbers have been finalized at this point in time, but it will be credit when the report comes out.
Q Do you have any preliminary numbers?
A Off the top of my head, my memory is we were up close to 300,000 acre-feet in storage account in the San Fernando Basin, but I am not positive of that number.
MS. SCOONOVER: Thank you. That's all.
MR. DEL PIERO: Thank you very much. Anyone else wishing to ask questions of these witnesses? Mr. Frink.
MR. FRINK: I don't have any other questions. Mr. Canaday, do you have other questions?
MR. CANADAY: Yes.
/////

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EXAMINATION

by MR. CANADAY:
Q Mr. Gewe, would you explain the MWD local projects program and how Los Angeles DWP can participate in that program?
MR. GEWE: Certainly. The local projects program is a program to encourage local agencies to develop their own supplies of water independent of what Metropolitan brings in in imported supply. They offer a credit of 154 dollars per acre-foot for every acre-foot of water generated by the local agency, primarily applying to water reclamation programs, although it also has been applied to water conservation programs in addition.
The department basically submits an application to MWD saying, we propose the following projects. These are what the costs are going to be, and as long as the cost of that project is greater than the cost of buying water from Metropolitan Water District, they will pay us 154 dollars an acre-foot as we develop the water.
Q This is for either Mr. Hasencamp or Mr. Gewe. How much water is used in irrigation on DWP lands in the Upper Owens River annually?
MR. HASENCAMP: A Upper Owens River being a Long Valley area?
Q Would be the Long Valley from Big Springs to Crowley

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Lake.
A I believe it is in the range of 20,000 to 25,000 acre-feet. That is applied water. A lot of that, of course, finds its way back.
Q And how much water is applied for irrigation purposes on LADWP land in the Owens River below Pleasant Valley to Haiwee Reservoir?
A I don't know that number. I don't have that.
Q Do you know the magnitude compared to the Upper Owens?
A Significantly more than Upper Owens.
Q Twice, three times?
A Probably 2 to 3 times more.
Q Earlier, Mr. Gewe, you testified that for social reasons, political social reasons, it was a decision of the Department not to reduce your irrigation uses along the Owens River by lessees; is that correct?
MR. GEWE: A I think that's Mr. Kuebler's testimony.
Q But that's correct to your understanding?
A To my understanding, we are following the long-term policy that has been in effect for at least a decade or longer in terms of water use.
Q Are you familiar with the leases?
A No, I am not.
Q Mr. Hasencamp, are you?
MR. HASENCAMP: A No.

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Q Are you aware that in the leases there is language that -- If you don't know about them -- I want to get back to the release of water down the Los Angeles River, recycled water. Explain to me again the reason for the decision to release that water.
MR. GEWE: A The decision actually has to do more with the treatment of sewage effluent than water supply. The plants were sited at convenient places upstream to intercept the sewage flow and treat it so that it did not get down and go beyond the capacity of the primary sewage treatment plant on the coast.
And so, consequently, these facilities were sited adjacent to river courses such that the water could be released to the river until such time as it could be used beneficially in other manners, and while it was being utilized that way, it's developed its own constituency.
Q Is there a possibility of diverting that water in other places to be reused for nonpotable beneficial uses?
A We would intend to take a portion of it before it gets to the river. There may be limited possibilities downstream, but it does degradate as it is in the river.
Q Why is that?
A Because of the urban runoff contributions that join the flow on its way to the ocean.
Q Touching on the subject of runoff, has the Department

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looked at the possibility of capture -- Last year was kind of a hallmark year down in the basin for local runoff. Has the Department looked at the possibility of capturing some of these runoff events in such places as the Los Angeles River or other possibilities to use the water for nonpotable purposes?
A We have not looked at doing it for nonpotable purposes, the primary problem being land space availability. Where do you store that water? There are no good reservoir sites to take it off stream and store it. We are working together with the L. A. County Public Works Department in terms of capturing water upstream of the river and using it in our spreading basin to maximize the groundwater recharge, thereby being available for potable use.
Q Portions of the Los Angeles River are concrete lined; is that correct?
A That is correct.
Q And the Department hasn't looked at using inflatable low-elevation berms to back up water?
A In fact, we do, not to back up in terms of storage, but to back it up and release it after the storm and then put it into spreading grounds. We have two of those in existence today.
Q In your ultra low flush toilet rebate program, you testified that the Department supplies 100 dollars to

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qualifying requests to retrofit; is that correct?
A Single family residential customers, and 75 dollars to multiple dwellings.

Q What's the cost of a unit?
A It varies from 40 or 50 dollars for an imported model to as much as hundreds of dollars for designer models.
Q I am assuming that the designer models probably are not found in South Central Los Angeles?
A That's probably a reasonable assumption. May I expand upon that with one more point on the program?
MR. DEL PIERO: I think you have expounded about as much as we want to know about it. I'm sorry, please go ahead.
A We actually have gone beyond the rebate in South Central. Most of those customers do not have the financial means to put the money up front for the toilets, and we with the Metropolitan Water District have gone aggressively into the community, developed a community-based organization, that will, in fact, install the toilets, and we will rebate the money to that organization.
MR. CANADAY: Q Mr. Hasencamp, I believe you testified earlier that comparing the two models in your one exhibit that you have, I believe you testified that in the long term it would be the position of the Department that they would rather, whatever lake level was chosen by the

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Board, would rather have a period of no diversion until the lake level was achieved, rather than an extended long-term period of some minimal diversion until that lake level was achieved.
MR. HASENCAMP: A No, that's not the case. It's very difficult to know how much water will be allowed to be exported during the transition phase. The Department of Fish and Game has certain fish flows. We have our own recommendation. There may be others, so until the Board knows what fish flows there are, it is very difficult to determine available water and how much water could be exported out of the basin, so just for analysis purposes, we did an analysis assuming no diversion, but it is certainly not the Department's position that that's our recommendation.
Q So, your preference would be, if the Board, in fact, implements a lake level and there is a transition period, you would request that there be some diversions allowed in that transition period?
A Yes.
MR. CANADAY: That's all I have.
MR. DEL PIERO: Thank you very much. No one else? That's it, I guess. Thank you, gentlemen, very much.
Mr. Birmingham.
MR. BIRMINGHAM: At this point, I would like to ask Mr. Hasencamp to stay at the table, and we would like to call

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Mr. Michael Deas who has not been sworn. Mr. Deas and Mr. Hasencamp are the last panel. May we take a few minutes to bring some of charts up?
MR. DEL PIERO: We will take a 10-minute break.
(Recess.)
MR. DEL PIERO: Ladies and gentlemen, this hearing will reconvene. Mr. Birmingham.
MR. BIRMINGHAM: Thank you. Mr. Deas has not been sworn.
(The witness was sworn.)
MR. DEL PIERO: Proceed.
MR. BIRMINGHAM: At this time LADWP will call Michael Deas and continue with the testimony of Mr. Hasencamp. I would like to start with Mr. Deas, if I may.

MICHAEL L. DEAS,

having been sworn, testified as follows:

DIRECT EXAMINATION

by MR. BIRMINGHAM:
Q Would you please state your full name and spell your last name for the record?
A Michael L. Deas, D-E-A-S.
Q Mr. Deas, by whom are you employed?
A I am self-employed. I am also a student at the University of California at Davis.
Q Did you prepare written testimony for submission to

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the State Water Resource Control Board in connection with this proceeding?
A Yes.
Q And is LADWP Exhibit 50 a copy of the direct testimony of Michael Deas which you prepared for submittal to the State Board?
A If it is labeled Exhibit 50, it is.
Q LADWP Exhibit 51 is the resume of Michael L. Deas. Is the resume of Michael L. Deas a document which you provided to our office?
A I believe so.
Q Does the resume of Michael L. Deas accurately state your educational background and work experience?
A Yes.
Q LADWP Exhibit 52 is documented L. A. Aqueduct Simulation Model Main Documentation. Are you familiar with that document?
A Yes.
Q And did you rely on that document in preparing your testimony in connection with this proceeding?
A Portions of it.
Q LADWP Exhibit 53 is a document entitled Los Angeles Aqueduct Simulation Model, Appendix A, User's Guide Release 1. Did you rely on that document in preparing your testimony, your written testimony?

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A Partially.
Q And LADWP Exhibit 52 is a document entitled, L. A. Aqueduct Simulation Model, Appendices B, C, and D. Are you familiar with that document?
A Yes.
Q And did you rely in part on that document in preparing your testimony?
A Yes.
Q LADWP Exhibit 52-C is a document entitled, L. A. Aqueduct Simulation Model, Appendices E, F, and G. Are you familiar with that document?
A Yes.
Q And did you rely on that document in preparing your written testimony?
A Portions of it, yes.
Q And LADWP Exhibit 52-D is a document entitled, L. A. Aqueduct Simulation Model, Appendices H, I, J, and K. Did you rely on that document in part in preparing your testimony?
A Yes.
Q Mr. Deas, would you briefly describe your education and your work experience?
A I am a registered civil engineer in the State of California. I studied at Mono Basin water supply since 1989. I have been directly involved in computer modeling in Mono

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Basin throughout that area and in the Eastern Sierra, Nevada.
I have a Bachelor of Science in Civil Engineering from the University of California at Davis. I have a Master of Science in Civil Engineering with emphasis on Water Resources from the University of California at Davis. Currently, I am enrolled in a Doctorate program of Civil Engineering in the University of California at Davis.
Q Would you briefly provide an oral summary of the direct written testimony?
A Yes.
Q Before I have you provide that oral summary, are there corrections that need to be made to your written testimony, Mr. Deas?
A Yes.
Q I am handing you a document that has been premarked as LADWP 50-A. Exhibit 50-A, is that a document that you prepared?
A Yes, it is.
Q What is LADWP Exhibit 50-A?
A It is corrections to my testimony.
Q Thank you. Will you please provide an oral summary of your written testimony?
A Yes. On page 3, the word "concerning" was misspelled and should be corrected. That is in the first sentence.
Page 25, the section labeled, "Seven. LAAMP: Mono Basin

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Fish Flow Releases," second paragraph, replace "the CDFG fish flows are similar" with "the CDFG fish flows are assumed similar."
Page 27, under Section III. A. 1, titled, "Maintaining Mono Lake Surface Elevation," in the second sentence of the first paragraph, replace "level is defined as a range of Mono Lake surface elevations below" with "level is defined as a

Mono Lake surface elevation below." Page 28, the section labeled "Four. Determining a Mono Lake Monthly Export," strike "Lake" and replace with "Basin." Similarly, for the first sentence in the accompanying paragraph, strike "Lake" and replace with "Basin."

Page 10, Table C should be replaced with this attached table. The numbers included in my testimony are from a different analysis, but these are the correct numbers now.

And on page 23, there's a correction concerning the topic Section C. 1., titled, "LAAMP Owens Valley Available Export," after meeting with the State Water Resources Control Board and Jones and Stokes in September, this area was worked out. We found out what the problem was. There still was some concern, and though we discussed what we thought was a problem, very, very recently we discovered an additional problem referring to the transit gain as represented in the LAAMP model using the DEIR.

On this correction sheet here, therefore, "LAAMP Owens

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Valley Available Export," in the accompanying paragraph should be replaced with what is titled here, "LAAMP: Tinemaha to Haiwee Transit Gain."

Q Mr. Deas, would you go ahead, please, and provide us with the summary of your written testimony.

Mr. Deas has made a request that he be allowed to stand at the podium when he is making his oral summary, if that's acceptable.

A I've already outlined my qualifications, so I will just start with the testimony directly.

I have completed a very thorough review of the LAAMP model which was used in the Draft EIR. This included a review of the available documentation, an extensive review of the computer code itself, subroutine input and output, as well as a review of the application, that is, using LAAMP.

My findings at this time are that the conceptualization. formulation, and application of the computer model are flawed in several areas and that these impacted the Draft Environmental Impact Report results.

I am going to focus on four general areas. The first is the application of LAAMP and the formulation of alternatives. Coupled with that will be a short discussion on the drought analysis and how it impacts the formulation of alternatives as well.

The third point will be discussing the LAAMP precisely

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and development of the model and finally an introduction of the L. A. model that has been developed for use in developing the Los Angeles Management Plan.

In terms of the LAAMP application, there's two points I would like to focus on, and the first is limited alternatives. Though four alternatives are given in the Draft EIR, the only real parameter with changes is the Mono Lake level with the exception of the 6372 alternative -- Excuse me, I'm going to back up. When I discuss alternatives, I'm essentially discussing the elevation alternatives, not necessarily the point of reference alternative or the no diversion alternative.

So, to reiterate, there is only a general set of operating criteria with the exception of the 6372-foot alternative where fish flows are altered from the other alternatives.

A wider range of impacts and perhaps more valuable information could have been determined if a range of irrigation practices were examined for each alternative as well as likewise, perhaps, the reservoir operating rules could have been altered for each alternative to determine the impact of reservoir operations at each elevation for Mono Lake.

That includes Long Valley Reservoir, Grant Lake Reservoir, different ecosystem maintenance flows or fish

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flows also could have been produced to allow a different range of impacts.

Likewise, Upper Owens River flow values could have been varied through a range such that it provided a better understanding of how this would react to changes rather than simply focusing on a single Mono Lake surface elevation, or in this case, a trigger.

The second point I would like to bring out with the LAAMP application is several results were produced in the DEIR which were not correct, and we have discussed some of them before. Certain reservoirs were allowed to exceed their capacity, certain points in the conveyance system were allowed to exceed their capacity, some of the operations were unrealistic.

The concern I have with that is that was not mentioned in the Draft EIR.

To someone who is familiar with the system, it cannot take long to find these erroneous results, and it was disturbing they were not discussed in any fashion at any point in the Draft EIR to the degree that it would have been useful. I will move on to the drought analysis. There's significant problems with the analysis itself in terms of impacting the lake elevation as determined by the analysis. There's also some assumptions which introduce uncertainty in the drought analysis.

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The significant items are neglecting the first year fish flows in the eight-year drought.

The second item is the incorrect termination of the drought. A drought has to end with a wet year. Otherwise, it is just a drought that keeps on going.

The third item is the drought severity, and I would like to spend just a moment on this so that we understand when I mention it.

A two-year drought as presented in the Draft EIR has a 59 percent of average runoff. A three-year drought has approximately a 62 percent of average runoff, so does the four-year drought.

When you go to a five-year drought, it has about 62 percent of average runoff, and the same for a six-year drought, and for a seven-year drought, the average runoff is 65 percent of normal, yet the drought analysis concluded in the Draft EIR used 60 percent.

The trend illustrates that as the drought duration increases, severity in general decreases.

The next point is the uncertainty produced. According to the criteria developed for the drought analysis in the DEIR, a six- and seven-year sequence were left out of the analysis. This impacts the frequency and duration of the proposed hundred-year drought. Also, the revised water balance equation has certain formulations, some of which

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introduce additional uncertainty in the process.

I am going to move forward to the model itself. Before I move into the comments about LAAMP, I want to back up and discuss computer modeling in general. We have to remember that a computer model is simply a tool that is going to help decision-making. It is not an end in itself. It is a means to an end. It is going to provide information upon which, with our professional knowledge, we will make a decision.

A computer model is essentially a numerical representation of a physical system.

When using computer models, it is important for people who develop and use the model to be qualified. They must understand hydrologic processes, and hydrologic processes as they apply to the study area.

They must have intimate knowledge of the system and not just the physical system that exists in the Owens Valley or Mono Basin, but how it works on a day-to-day or month-to-month or year-to-year basis.

Finally, they need to understand the computer code, how is the code written, what are the limitations of the code, what are the assumptions in it relating to the code. This is important because people always talk about interpreting model output.

Well, just as important is interpreting model input.

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You must understand what goes into the model, how the model uses it and what the output means.

In constructing a computer model, there are some basic steps, and I'm going to take what -- other people might have several steps, I'm going to reduce it down to three or four steps.

The first one is conceptualization. That's where you sit down and say, I would like to have a computer model, and this is what I would like it to do. I would like to analyze the Sierra Water Gathering System for the City of Los Angeles, as an example.

This is an intensive step. You need to gather a lot of information. You need to inventory the system in terms of the capacity of the streams, understand how operations work, determine what data is available, and essentially in your mind or on paper conceptualize how you want the system to Work and what information you want to receive from it.

The next step is formulation, and this is where you represent your conceptual model in a numerical scheme. I include coding modeling as Step 2, because computer codes or computer stability will be a limiting factor when developing a model. If we have a very computationally-intensive model, I may not he able to run it on a personal computer that I have on my desk. I might need a much more powerful computer and that might constrain the type of approach in using the model.

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So, we have covered conceptualization and then we formulate the problem as a numerical problem in a computer model, and finally, when We are done, we apply the model.

When I talk about application, I am going to break it into two steps.

The first is somewhat of a verification/ testing the model. As you are building the model and after you complete the model, you want to apply the model under controlled situations to determine what the output from the model is, and if the output is indeed correct.

You can test the model specifically, which includes running historic periods, determining if the model produces output which is similar to the historic period. And likewise, you can justify the model to many cases and examine the output carefully to assure the model is producing correct and reliable results and realistic results.

Modeling is an ongoing process, and as you use the model through time and there are modifications to the model. and new applications are made, you need to be careful and review the model output to ensure the model is still performing properly, especially through the modification.

Finally, when you are done with this process, actually at the same time you do this process, you should be documenting everything that is done, because modeling is a scientific process or basis for scientific processes or

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reproducible results. If I can do something and I can't leave enough information behind that someone else can reproduce it, many could argue that's not science.

So, documentation is essential for computer modeling. Without these steps there is uncertainty in modeling application, especially without testing and verification, there is limiting confidence in the results that can come from a computer study or modeling study.

With that in mind, I'm going to move to LAAMP now. In essence, the conceptualization, formulation and application of certain aspects of LAAMP were inadequate. Some examples we have heard about already, but I will go through them again.

For example, Long Valley capacity is allowed to exceed the stated maximum of the reservoir in the model. That wasn't very clear, maybe. Long Valley has the capacity of 180,000 acre-feet, but in the Draft EIR, LAAMP allows Crowley to go to 210,000 in some cases. For given alternatives, it spends more time in excess capacity than others.

If we move right down the system to Pleasant Valley outflow, there is no constraint in Pleasant Valley outflow. Even though the user may specify in the input file a maximum Pleasant Valley outflow number, the number is not used in the computer code. As a result, Long Valley outflow is allowed to exceed the specified capacity and the physical capacity of moving water through the reservoir outlet works.

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A third point is Tinemaha is also not constrained and within the DEIR alternatives, there are several instances where it exceeds capacity.

Something that we heard about before, Tinemaha and Haiwee evaporation. Again, right in the input file, so the user can specify what the evaporation is at those reservoirs, it is not used within the model and was not included in the results of the DEIR alternatives.

Owens Valley pumping; though pumping was held constant in the Draft EIR, a pumping input file was required for making the DEIR run. This input file was formulated using LAAMP. However, the pumping logic for the formulation of that pumping file is incorrect. That impacts pumping.

I am going to move on to demand priorities, because LAAMP is a demand model. It demands water from the system and you must meet that demand.

This issue is a little bit complicated, but we can all work through it. I am going to try to explain it as clearly as I can.

This is a general idea of how demand in LAAMP works. There is a certain monthly demand required for Southern Owens Valley or Haiwee for water in Los Angeles.

LAAMP determines the amount of Owens Valley available water and compares it with the demand, so if I have a certain demand of 100 units, for instance, and my Owens Valley

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available water is 125 units, I have excess. In that case, the model, because of excess, apportions excess water back into the basin as it is possible. That is the Owens River Basin. If my demand is 100 units and I only have 75 units of Owens Valley available water, the computer program steps into a subroutine called Not-enough. It needs more water.

The priorities within that specific Not-enough are first to Tinemaha and Haiwee Reservoirs within the Owens Valley for water. It will take a little bit of water from them, or maybe it might meet the demand or might not. We are going to assume throughout this discussion it does not.

If that doesn't meet the demand, the second priority is to export water from the Mono Basin. If that does not meet demand, the third priority is to not increase storage in Long Valley. If that does not meet the demand, the fourth priority is to reduce Long Valley to the minimum. If that does not meet the demand. and there are consecutive dry years, the program allows reduced Owens Valley uses.

Finally. if you cannot meet the demand, the demand is Just reduced to the available amount of water.

The concern with this is the second priority. The first place you looked was Tinemaha and Haiwee for extra water, then to the Mono Basin. That's the second priority. Then, to Long Valley, and so on.

However, if you look at how exports from the Mono

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Basin is governed, there is conflict between demand and operations of the Mono Basin.

The trigger matrices require a certain amount of water to be released to Mono Lake each year. No exports can occur until those releases have occurred. Thus, if we are early in the year and we look to Mono Basin for water, from subroutine Not-enough, we cannot obtain the water because the lake releases have not been met. I hope that's clear. Ask me questions about it later if it is not.

The demand priorities and the subroutine Not-enough, when you are trying to meet Los Angeles' demands, are first to take water from Tinemaha and Haiwee. Second, Mono Basin, and third, Long Valley. Fourth is Long Valley down to the minimum, and fifth is reduced dry-year uses.

But often when the subroutine is called, especially early in the year, lake releases have not been completely met in the Mono Basin, and as a result, we cannot export from the Mono Basin, that priority is not met. you go on to Long Valley.

The next point is reservoir representation within the DEIR alternatives, though reservoirs are allowed to have different target storage for each month of the year for specific year types, wet. normal, and dry and defined by the user, in the DEIR they were all assumed as one type of year. Reservoir supply, viable flexibility to L. A. aqueduct system:

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Without taking into account current-year hydrologic conditions, let alone previous-year hydrologic conditions, it reduces the flexibility and efficiency of the system and can impact results of the model.

Next we are going to talk about Mono Basin exports.

MR. HERRERA: Twenty minutes.

MR. BIRMINGHAM: I make application for additional time because of the complexity of the issues being discussed.

MR. DEL PIERO: How much?

MR. BIRMINGHAM: Ten minutes.

A On Mono Basin exports, one of the important aspects of modeling assistance is to completely represent realistic operations.

If you look at 1983, there was almost no exports from the Mono Basin. Because the system was essentially full,

there was very little reservoir storage, if any, and the conveyance was also at capacity for many months of the year, at least for the runoff months of the year. Thus, it was not a wise decision to simply export water from the Mono Basin which could not be either stored or conveyed to Los Angeles. It wouldn't be a wise decision to export water from the Mono Basin, subsequently pass through the system and dump it onto Owens Lake.

It is important for a computer model to attempt as best it can to look down the system, take into account

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conditions of down system reservoirs and conveyance, and to determine whether exports should be allowed from Mono Basin. LAAMP allows the users to enter a maximum Mono Basin export for each month of the year, but every year is different. You have hydrologic sequences, something like 1983, comes along where there is so much water you don't need or simply don't want to export from Mono Basin. In that case, the computer model should recognize the condition of the system and not export water as well.

LAAMP does not allow for this analysis.

I mentioned in my corrections that there was a Tinemaha to Haiwee transit gain correction required in LAAMP. Throughout the model, transit gains and transit losses are carefully represented as either positive for gain or negative for a loss, and the sign in the computer code for the transit gain from Tinemaha and Haiwee is a minus, so instead of adding 9,300 acre-feet per year, you subtract 9,300 acre-feet per year. The net error is over 19,000 acre-feet per year.

For the information of some of the participants -- never mind, I will move on. There are also several minor errors, conceptual errors in simply coding mistakes that aren't worthy of mention maybe in this testimony, but they are written in the testimony or in the comments of the Draft EIR, if anyone cares to look at that.

I would like to mention that the Tinemaha transit

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gain was in error. We had the feeling something was wrong because when we compared the output from the L. A. model with the output from the LAAMP model, there were discrepancies in the Lower Owens Valley.

As I mentioned in the corrections, we discussed this in a meeting with the State Water Resources Control Board and Jones and Stokes in September. The problem we thought it was, was not, that it was corrected, but we still had a concern, and only recently decided it should be noted. Without having a separate model such as the L. A. model, this error might never have been found. These examples illustrate the conceptual problems and their realization in LAAMP. The result is uncertainty in the model output and results enclosed in the DEIR. This impacts Mono Lake fluctuations, Mono Basin exports, Haiwee exports of flow to Los Angeles, general operative system response.

I am going to leave LAAMP now and move to the L. A. model. The City of Los Angeles or the Department of Water and Power, created a model of the L. A. aqueduct system which extends from the Mono Basin to the City of Los Angeles. It is a monthly model. It has been completed under the general basics of modeling, that is, it has conceptualization phase, formulation, application and testing and it is well-documented. It is especially important to them because as a municipal agency, they have quite a bit of turnover. One day

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there is a modeler there and the next day there is not, so it is important to have complete documentation.

I should note that it is an in-house model and it's used for operations and planning, there's expertise required, there is training required. It is not a user-friendly model.

The application of this model was used in developing the Management Plan that Mr. Hasencamp will present soon, and as I mentioned, it was used in the LAAMP review process.

I would like to note it has a degree of flexibility in its structure that can be modified fairly quickly by people who want to modify it, and in fact, at the request of the State Board staff, the model was modified in, I believe, fairly short order to include Upper Owens River minimum flows and Mono Lake transition analysis which allows limited exports as the lake is rising as shown in the model.

In. concluding, I would like to note, or even reiterate the formulation of alternatives was limited, and the output produced by the model and included in the Draft EIR included erroneous results which were not addressed.

Second, the drought analysis contains significant errors which overestimate that the lake levels declined by not just a percentage of feet, but several -- I don't want to say several, but by a few feet in certain circumstances.

And finally, the assumptions you use in the analysis introduce the issue of uncertainty.

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Moving on to the LAAMP computer model, as I mentioned earlier, it has not been satisfactorily demonstrated that the model produces accurate output to the degree that I believe will be required for the EIR. There are significant conceptualization and formulation errors that were realized in the application of LAAMP. They do impact many portions of the L. A. aqueduct system and thus the results shown in the Draft EIR.

And I would like to close with the fact that there is a monthly model of the L. A. aqueduct system that is currently being used to analyze the City of Los Angeles' Management Plan for the Mono Basin and Eastern Sierra water collection system.

Thank you.

MR. BIRMINGHAM: Thank you. Mr. Deas.

(At this point, direct examination was continued of Mr. Hasencamp.)

MR. BIRMINGHAM: Mr. Hasencamp, you briefly testified about your qualifications, but at this point, I would like to refer to LADWP Exhibit 53, a document entitled, Direct Testimony of William J. Hasencamp. Is LADWP Exhibit 53 testimony which you prepared for presentation to the State Water Resources Control Board in connection with these proceedings?

MR. HASENCAMP: Yes.

Q And LADWP Exhibit 54 is a document entitled Resume of

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William Joseph Hasencamp. Does LADWP Exhibit 54 correctly state your education and work experience?

A Yes.

Q And LADWP Exhibit 55 is a document entitled Los Angeles Department of Water and Power Runoff Forecasting Model for Mono Basin and Owens Valley.

Were you involved in the preparation of LADWP Exhibit 55?

A Yes.

Q And did you rely on LADWP Exhibit 55 in the preparation of your written testimony?

A Yes.

Q I will not ask you to again repeat your work experience and education. At this time, would you please briefly summarize your written testimony?

A I don't believe I summarized my resume.

Q I will ask you to.

A I received a Bachelor of Science degree from the University of California at Long Beach and a Master's Degree in business administration from Pepperdine University. I am a registered civil engineer and I have been working with the L. A. Department of Water and Power since 1987.

I have been involved in the forecasting group which forecasts the water supply and runoff of the Eastern Sierra and I have worked with the divisions that supply water to the

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City, and coordinated the delivery of water to Los Angeles.

Q Would you please briefly summarize LADWP Exhibit Number 53, which is your written testimony.

A Certainly. I have a few corrections, if I may, before I begin. The first is on page 36, the first bullet under B, Streams Flow Criteria. That should read no diversions for export from Walker and Parker Creek.

On page 39 in the title of Figure 2, strike the words, "and minimum."

On page 43 the legend for Figure 4, strike the number "6376.3": and then it should read "minimum export level." The number is stricken.

On page 43, the title of the middle column reads "Average Annual Lake Releases". It should read "Average Annual Flow Not Diverted for Export."

And lastly, on page 46, the reference to the people of Los Angeles decision should read "34 Cal 2nd 695" instead of 35.

I will begin by putting up an exhibit for my

testimony.
MR. DEL PIERO: I want to apologize, but in about five minutes I have to make a phone call. You go ahead and start. I just want to tell you that in about five minutes I am going to have to break for a phone call, and I apologize. You go ahead.

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A I want to begin by giving an overview of the Eastern Sierra hydrology.
The Eastern Sierra is much different from the Western Sierra in that the basins are snow-driven rather than rain-driven. This means that the flood control requirements on the west side of the Sierra are not necessary because the stream flow follows the precipitation by several months.
In the Eastern Sierra, we use the runoff year rather than the water year which is used in the western side of the valleys.
The runoff year begins in April, and this is important because the precipitation and runoff in any given runoff year are independent of each other.
For example, in the 1993 runoff year, the current year we are in, the runoff is well above normal, but the precipitation so far this runoff year is extremely low. The water supply forecast is completed, or is begun February of each year. The Department of Water and Power, along with other agencies throughout the State, measure the snowpack at the same locations each year, on February 1st through May 1st at the beginning of each month.
Along with those snow surveys, the Department of Water and Power issues a runoff forecast. On February 1, the forecast is not very accurate since there is a large range of possible outcomes for the rest of the winter.

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On May 1, the forecast is much more accurate. Our forecast report indicates that our forecasts are about 5 percent plus or minus. We also make monthly runoff forecasts. However, they are much less accurate, because they are dependent upon future temperatures which are impossible to predict.
Once the forecasts are made, the operations are planned for the year. The operator of the aqueduct determines how much pumping is allowed from the Owens Valley groundwater and that is usually from a consensus between Inyo County and staff of Los Angeles Department of Water and Power. The operational plan also looks at the storage requirements of the system. What is the storage at the beginning of the runoff year and what storage do they want in the reservoir after the runoff year for next year's demands.
Also, the operator looks at how much water is available from the Mono Basin and how much water may have to be spilled onto the Owens Lake because of capacity reasons or spilled into the Owens Valley.
The operation plan is coordinated with the water operating Division, and they determine how much water will be pumped from the Owens Valley, from the San Fernando Valley groundwater basin and how much will be purchased from Metropolitan Water District.
Typically, Metropolitan Water District is the last

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line of supply. And the Department of Water and Power tries to use its own supply first. Also, the plan tries to estimate the timing of the delivery of water from the aqueduct system. The water is more valuable in the summertime, so the more water that we can supply in the aqueduct in the summer months is more desired.
Now, although a plan is made for the year, hydrologic conditions can change quickly. The timing of the runoff can be quite different than expected. A very warm snap will cause the runoff to occur much earlier than anticipated or a cold wet spring may delay the runoff until much later in the summer.
Also, the forecasts have monthly averages, while the daily conditions might be quite extreme. So, daily monitoring of the system is necessary.
Our operators on weekends have beepers with them so they are in constant contact with staff in the Owens Valley. We also every day monitor the dally report Which gives us an overview of the current flows in the Eastern Sierra.
Additionally, operators need the ability to respond quickly in cases of emergency. System failures need to be addressed immediately and cannot wait. Also, sudden storms such as the one that occurred in 1989 in Olancha warrant immediate action. The operator needs the flexibility to be able to respond in these emergencies.

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Operational restrictions can hamper the efficiency of the system. Some restrictions may appear beneficial with computer models. However, they may, in reality, have detrimental effects. For example, minimum reservoir storage might improve the recreation of the reservoir, but it might also offer more spills of the reservoir or might limit the ability of the applicant to deliver water in drought years.
Wet year exports out of Mono Basin reduce Mono Lake fluctuations, but they also create the threat of spills to Crowley Lake and other negative impacts of high flows in the winter in the Owens Valley.
And determining operations from April 1st might simplify the plan for Mono Lake exports, but it also will bring wider fluctuations in the level of Mono Lake.
MR. DEL PIERO: Mr. Hasencamp, I am going to ask you to stop there.
A That's good timing, because I was going to get to another exhibit.
(Short intermission.)
MR. DEL PIERO: This hearing will again come to order. Mr. Hasencamp, thank you very much for allowing me to interrupt your presentation. I appreciate it. Please proceed.
A All right, I would like to start off by talking about the DWP Operational Management Plan. There has been a lot of

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talk about this over the last several weeks, so I want to try to answer all the questions that might have come up during that time. The first point I wanted to make is that there are three components of the stream flows in the Department of Water and Power Operational Management Plan. The first is the minimum fish flows. We derived the minimum fish flows from the testimony of our expert witnesses on fisheries. The minimum flows are shown on Table A from my direct testimony. The flows on Lee Vining Creek range from 15 to 25 cfs and on Rush Creek between 20 and 30 cfs.
Additionally, in the Management Plan, the streams have lake level releases because the stream flows are not enough to keep Mono Lake at the level of the Department of Water and Power Management Plan. So, on top of the fish flow releases, lake level releases supplement flows.
A third component of the stream flows is the wet-year operational releases. In the very wet years when capacity is exceeded in the system, water is released down the four streams into Mono Lake. Now, the average stream flows are listed in Table B, and I have a pointer so I can use my chair.
The average is the top line, and this average mimics the natural hydrograph which is shown in Figure 2 and I don't have an exhibit of Figure 2, but the peak flows occur in June and July. On Rush Creek, the peak flow average is 167 cfs and on Lee Vining Creek it is 75 cfs. Now, those are average

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flows. The maximum flow on Rush Creek is 350, which is the capacity of the return ditch, historically, and 280 on Lee Vining Creek.
I also want to point out that these flows are monthly averages. The daily averages and instantaneous flows will be much higher. specifically on Lee Vining Creek because there is no upstream storage facility.
I also want to emphasize that the DWP Management Plan allows for flow-through conditions on Walker and Parker Creeks. These creeks would return to the natural hydrology without any diversions for export. The only exception would be irrigation diversions from Parker Creek when there is sufficient water to maintain the fisheries. That could be exports, or that could be diverted for irrigation.
Figure 3 shows the range of lake levels under the Mono Lake Management Plan. The Management Plan proposes that there will be no export when Mono Lake is below 6377 feet during certain times of the year and 6376.3 feet during other times of the year. The reason for this difference is that Mono Lake naturally fluctuates. It typically rises during the winter and early spring, peaks in mid-summer, and then falls throughout the late summer and into the fall season.
So, the floating minimum mimics the Mono Lake

fluctuations.
I want to point out on the Management Plan that one

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of the striking aspects of the Plan is that for most of the hydrology, the lake level fluctuations are very small. In fact, often it follows just the range of lake level fluctuations that are listed in the minimum range of 6376 to 6377. And, in fact, in only four years does the lake go below 6376, and in the historic hydrology, this a repeat of the historic hydrology for 1941 to 1993, the lake would fall to a low of 6374.6 feet. It would reach this minimum point in December of that year. So that from the summer season the lake. under this plan, would never be below 6375 with this hydrology.
The other thing about this figure that is noticeable is that the lake rises very sharply during the wet period of '82 through '86. This is an unprecedented wet period in California. In fact, 1983 is the wettest year on record in the State, and '82 and '86 were also extremely wet years.
When we put together our Management Plan, we try to model for 53 years. When you model for a long time period, there are certain situations where you would change operations from a general operating plan so that if 1983 conditions were to occur again, we would bring the reservoir lower than we would typically to make room for the runoff that we knew would be coming from our snow surveys.
Additionally, we would increase the spreading onto the Owens Valley floor so that, again, we would make room.

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With these operational modifications, if we did have a repeat of this period, I believe we could prevent the lake from going that high, and we would significantly reduce the rise.
Now, we also completed a drought analysis which is Figure 4. The driest period on record for the Eastern Sierra was the 1987 through 1993. It just so happened that period followed one of the wettest periods in the State's history, so the historic hydrology was good to us in that the lake, in our Management Plan, was higher than it would have been normally when the drought did occur. So we did a separate drought analysis where we said, what if the same six-year drought occurred when Mono Lake was at our median level of 6377? What we did in preparing this drought analysis is we compared the actual versus the calculated lake levels during that six-year drought event. We noticed that the actual level was slightly below the calculated level and that's because that in an extended drought a lot of times the unmeasured inflow to the lake and to other parameters is reduced, and we notice that the actual level was eight-tenths of a foot below the calculated level.
So, what we did is we simulated this drought using the LAASM model and we subtracted eight-tenths of a foot, to be conservative, from the cumulated, so that the last year was eight-tenths of a foot lower than the calculated level.

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Our drought analysis shows that the minimum Mono Lake level would reach, if We repeated the drought of '87 through '93, would be 6378.3 feet. This level was more than 1 foot higher than the minimum Mono Lake has reached and it is also almost exactly equivalent to last year's December lake level.
We will go to the next figure --
MR. HERRERA: Twenty minutes.
MR. BIRMINGHAM: I would make an application for an extension of ten minutes.
MR. DEL PIERO: Ten minutes.
A Table D summarizes the exports from each creek under the Mono Lake Management Plan.
MR. DODGE: Can someone tell me where I can find Table D?
MR. BIRMINGHAM: Table D.
MR. DODGE: Thank you.
A Now, this shows that with the repeat of historic hydrology, Lee Vining Creek would divert 25,500 acre-feet, and 23,000 would remain in the stream. In Rush Creek, 20,000 would be diverted and 39,000 would remain in the creek. And Walker and Parker would not be diverted so the entire flow would remain in the creek. Walker and Parker eventually flow into Rush Creek, so the flows in Rush Creek in the bottom-land is the sum of the Rush Creek releases plus the Parker and Walker Creek releases minus any transit loss.

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Q So, the net effect of the DWP Management Plan is that 37 percent of the water would be exported from the Mono Basin of the runoff and 63 percent would not be exported.
So, roughly one-third would be exported to the tunnel to the Upper Owens and about two-thirds would stay within the Mono Basin.
For the DWP Management Plan reservoir storage is operated concurrent with the seasonal cycles. Typically, storage is at minimum in the spring and peaks in the late summer. This maximizes the yield of the reservoir and minimizes spills.
For Grant Lake, the Management Plan provides that no exports be allowed when Grant lake is below 11,500 acre-feet. This means that this results in the reservoir being above 18,000 acre-feet during the summer season most of the time.
For Crowley Lake Reservoir spills would continue to be avoided whenever possible. In fact, Crowley Lake Reservoir has never spilled. Typically, the reservoir remains above 120,000 acre-feet during the summer season.
Now, this shows our planned fluctuations of both Crowley Lake and Grant Lake storage (Figure 5). The 1983 period was a very wet period. If the snowpack is known to be very large before the runoff season starts, water can be taken from the reservoirs so the reservoirs are at a lower level and then more room is made in the reservoirs and less water might

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be released to Mono Lake to minimize the rise in the lake again.
Irrigation will continue within the Mono Basin, but not as much as it has in the past. Historically. we irrigated 9,000 acre-feet in the Mono Basin. The DWP Management Plan proposes to irrigate 3,000 acre-feet. This would occur from South and East Parker Creeks. These are creeks that are outside of this hearing process, and we have riparian rights on those creeks. Also, irrigation would continue to a limited extent on Gibbs Creek and Upper Parker Creek. Irrigation would only occur on those two creeks when there is sufficient water to maintain the fish flow requirements. The net effect is that the irrigation will be 3,000 acre-feet per Year.
In the Owens Valley, the irrigation policy will remain consistent with the present policy and past practices. Under the DWP Management Plan, the export will average 46,300 acre-feet and the flow to Los Angeles would average 403,000 acre-feet. This, again, is based on the historic hydrology.
If there is a drier period, the Department would export less water out of Mono Basin. But the Mono Basin water has the first priority in the DWP Management Plan. IF there is a dry period, the DWP diversions decrease first while the amount of water going to Mono Lake remains the same.
So, in summary, the testimony that we have heard from the DWP witnesses has been used to formulate the DWP Mono Lake

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Management Plan. We feel that this Management Plan is a reasonable plan and it serves the public trust resources of the Mono Basin, as well as providing water to Los Angeles and the Upper Owens River.
MR. BIRMINGHAM: Q Mr. Hasencamp, if I may follow up with just one question, you referred to the 1983 period, and he indicated that based on forecasts, adjustment could be made in the reservoirs along the aqueduct out of the Mono Basin, so as to minimize a rise in the level of the lake?
A Yes.
Q Would it be advantageous to minimize a rise in the level of the lake during a wet period similar to that of 1983?
A Well, I understand from previous testimony that if the lake were to rise too high that there is danger of tufa toppling and danger to the sand tufa and also to the Paoha Islets, a potential for erosion of those islets if the lake goes too high and rises too rapidly.
MR. BIRMINGHAM: Thank you very much.
MR. DEL PIERO: Thank you, Mr. Birmingham. Ms. Cahill.
MS. CAHILL: Mr. Thomas has a short series of questions for Mr. Deas, and then I will ask Mr. Hasencamp questions.
CROSS-EXAMINATION
BY MR. THOMAS:

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Q Mr. Deas, I appreciated your clear explanation of a

computer program. For those of us like myself who are not computer literate, it's interesting.

I wanted to ask you basically about one area of your testimony and that was your discussion of the LAAMP defects. You told us, I understand, that the reach from Tinemaha to Haiwee Reservoir was incorrectly coded in the LAAMP model. Is my understanding correct?

MR. DEAS: A The transit gain between Tinemaha and Haiwee Reservoir was incorrectly coded into the LAAMP program.

Q And, in fact, it was designated in the model as a transit loss of 9300 acre-feet?

A It should have been added in that reach and it was subtracted.

Q Where did the information arise that gave you the LAAMP model, the belief that 9300 acre-feet was lost?

A Could you restate the question?

Q How was it that the LAAMP modelers made the assumption there was a 9300 acre-feet loss in that reach?

A That would be answered by them.

Q Are you aware of any studies or any hydrologic data that supports the understanding there was loss there?

A Oh, no.

MR. HASENCAMP: A We provided date for the modelers

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of the LAAMP of where the system gains water and where it loses water and in the stretch between Tinemaha and Haiwee, there happens to be a net gain of water because of unmeasured inflow of some groundwater flow into the system. And it was not that the modelers of LAAMP intended to subtract the output, but it was an incorrect coding into the model itself.

Q And was that incorrect coding based on an incorrect understanding of hydrology?

A No, it's not, because the input sheet specifically said it is a transit gain, Which is a spreadsheet, but the code itself was not consistent.

Q Where did that gain come from, again?

A It would come from unmeasured inflow into the aqueduct. We don't measure every drop of water that gets into the aqueduct, so it is basically a balance, so if there's any groundwater inflow or streams that make up that that aren't measured, it is called a transit gain.

Q So, as groundwater moves down the hill toward the river and the aqueduct, it increases the flow; doesn't it?

A Sometimes it does that, yes.

Q Is that the source of that transit gain?

A A portion of it.

Q And has there been any field testing or hydrologic work to determine the extent of those gains?

A No, we know how much comes into the system and how

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much is out of the reservoir. That's how it is calculated.

MR. THOMAS: Thanks very much.

MR. DEL PIERO: Ms. Cahill.

CROSS-EXAMINATION

BY MS. CAHILL:

Q I would like to generally try to go through your testimony sort of in order so it is easy for all of us to find the various references.

A Starting on page 35 in the first paragraph, you have a reference to a sentence that states: Water must be released out of aqueduct spill gates long before a reservoir such as Crowley Lake is close to spilling.

Where are the aqueduct spill gates?

MR. HASENCAMP: They are in the Tinemaha/Haiwee section of the aqueduct.

Q There are no spill gates on Crowley Reservoir; are there?

A Well, there is a spillway, but there are no gates.

Q What about on Grant Lake?

A No.

Q I would like to turn next, then, to page 36 where you summarized the LADWP Management Plan, and under -- well, to begin with, in the second paragraph under Roman numeral II you say the LADWP Management Plan includes the operational requirements necessary for balancing the needs of

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the public trust resources of the area while allowing for sufficient flexibility in operations.

Did you balance fishery flows in the stream against operational needs?

A No.

Q Going now down to the stream flow criteria, the first is: No diversions from Walker and Parker Creeks.

You indicate. I think, that there will be no diversions downstream of the conduit on those streams is that correct?

A Yes.

Q But that there might be diversions upstream on Parker and South Parker and Gibbs "when fish flows are met"?

A Yes.

Q What fish flows on Parker Creek?

A Well, we assumed the fish flows on the preliminary injunction, or I believe they are called the interim flows.

Q And the next one, basically: Average flows on Rush Creek are 35 cfs winter and 106 cfs July.

If you would turn to your Figure 2, this is the figure that originally labeled, average and minimum flows under the LADWP Management Plan and you have amended it today to take out the words "and minimum."

Originally did that table have minimum flows as well? There appears to be space to the right of the average flow

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legend that I suspect might have had minimum flows at one time?

A I don't believe so.

Q And in the L. A. Management Plan which is LADWP Exhibit BB, there is a statement that says: Minimum stream flow releases for Lee Vining Creek will range from 16 cfs in winter to 74 cfs in June.

Now, that's not true, that those are the minimum flows; isn't it?

MR. BIRMINGHAM: Objection, ambiguous.

MR. DEL PIERO: Because of the range?

MR. BIRMINGHAM: Because of the reference to those flows.

MS. CAHILL: Range from 16 cfs winter to 74 cfs in June.

MR. DEL PIERO: Overruled. You may answer the question.

A No, those are not the minimums.

Q In fact, are those the averages?

A Yes.

Q And the next sentence in that plan states: Rush Creek will range from 35 cfs in winter to 106 cfs in July. Is that actually the complete range of flows that we will find on Rush Creek?

A No.

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Q So, in fact, these statements in the Management Plan are inaccurate; are they not?

A They might be interpreted incorrectly.

Q The next bullet under stream flow is the average flows in Lee Vining, and then it says: Spring or summer flushing flows set for each creek.

Did you ask Dr. Beschta for numbers to set flushing flows?

A No.

Q Did you ask Mr. Hanson for a number to set flushing flows?

A No.

Q Did you ask Dr. Hardy?

A No.

Q From which of your experts did you get the flushing flows that you set in your Management Plan?

A Our experts did not give us numbers. They gave us a pattern of flows and that's the key, is the pattern to mimic the natural hydrograph and that is what we have done in our Management Plan.

Q What is the magnitude of the flushing flow that you set?

A One of the things about a monthly model is that there is no monthly model that adequately can model daily flows, and so what we did is assumed an acre-foot value for a given month

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and the acre-foot values for Rush Creek and Lee Vining Creek are equivalent to 150 cfs for 10 days with a ramping period of 25 percent increase every eight hours on the rising limb and 25 percent decrease every 24 hours on the descending limb. But you could have the same exact output in the model if you

change the shape and rather than having the constant 150 for 10 days, have it rise much higher earlier and drop off lower later.
Q Did you, in fact, set the flushing flow you have just described, 150 cfs for 10 days, with that ramping that you described?
A Well, that's how we determined the acre-feet value.
Q Is that on Rush as well as Lee Vining?
A Yes.
Q That same flushing flow on each?
A Yes.
Q And is that, in fact, lower than the court-ordered flushing flows?
A Again, it's an acre-foot volume and so you can have the pattern change, have the same acre-foot volume, so you could release the same values and have it be equal, lower, or higher than --
Q In other words, you could have a higher flow for a shorter duration?
A Yes.

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Q But, in fact, you could not have the flows for the duration set by the court?
A Correct.
Q And you could not have the flows recommended by the Department of Fish and Game for the duration recommended by the Department of Fish and Game within the parameters that you have input to your model?
A Correct.
Q And in fact. are you the person who decided what the input numbers were?
A No.
Q Who was?
A Dr. Randal Orton of my staff consulted with some of the other fishery experts and he gave them to me, and I incorporated them into the model.
Q And what is the scientific basis for those flows?
A I can't answer that.
Q And speaking of inputs, is there in any of the documentation we have been provided information that tells us what all the inputs are to LAASM when you run it to come up with the L.A. Management Plan?
MR. DEAS: A Would you repeat the question, please?
Q Yes. The Los Angeles Management Plan has certain criteria, according to Mr. Hasencamp's testimony. Is there a list of those criteria that you then input into the LAASM?

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A I think that is a little different than the last question.
Q Let's try this new version.
A I am going to reflect on what you said previously. The documentation that was supplied to you was how to use the model. It is not specific to any particular plan. If you want to learn how to use the model, all the information is there such that you could reproduce the L. A. Management Plan.
Q So, then my next question is, have we been provided with the inputs that you would input to be able to run the L. A. Management Plan?
MR. HASENCAMP: A No.
Q We have not been provided, have we, with the target storage levels, at least not in all cases?
A No.
Q And we have not been provided with the flushing flows?
A No.
Q And we are not certain exactly how much irrigation will be allowed on Parker Creek, for example?
A No.
Q Are you intending to provide the Board and the other parties the input to LAASM so that they might run the L. A. Management Plan?
A That is certainly something that we could do if we

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were requested to.
Q And I guess I have been focusing on input. What about output? Do we have, aside from these summaries that give us averages, do we anywhere have the output that would show us for a given year type what the stream flows would be under LAASM?
A No.
Q And do we anywhere have the output that would tell us what the flows are over on the Owens River system?
A No.
Q Do we have enough information to allow us to evaluate what actually happened under the Los Angeles Management Plan?
A Well, we certainly can provide any information. I don't know how much information you need to make a decision or to feel comfortable with, but we will provide you with any information.
Q Now, the flows that We do have, the average flows that are shown on Figure 2 on page 39, your input flows don't vary according to wet, normal, or dry years; do they?
A No.
Q So, your input of the minimums that are shown on Table A on page 40, those are inputs in each and every year regardless of year type; is that right?
A Yes.
Q And those flows were provided by Drs. Hardy and

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Hanson; is that correct?
A Yes.
Q And both Dr. Hardy and Dr. Hanson testified that they had not reviewed the Department of Fish and Game's final Lee Vining Creek report; is that correct?
A Yes.
Q And, in fact, I think each of them stated they might reevaluate the Lee Vining Creek flow recommendations in light of that newer report; is that right?
A Yes.
Q And do you intend to have them do that and perhaps input new objective numbers as Lee Vining Creek numbers?
A Yes, if they review it and come up with new minimums that they are comfortable with, we will incorporate that into the Management Plan.
Q And have you attempted to run LAASM using the Department of Fish and Game's stream requirements?
A Yes.
Q And had those results been produced?
A No.
Q Would you produce them?
A Well, I would like to say that the State Board staff has asked us to do several runs, including the Department of Fish and Game runs, and runs at several target elevations, and in fact, compare the results with the LAAMP model, so we do

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intend to present that to the Board, and any other runs the Board would like we would be more than happy to assist them.
Q When you look at Table B on page 40, is there any way of telling how often a given flow will occur?
A No.
Q And in fact, is it true that on Lee Vining Creek the minimum flows from Table A are in effect approximately 77 percent of the time.
A I am not sure I understand the question.
Q Is it the case that a majority of the time on Lee Vining Creek the flows will, in fact, be within 1 or 2 cfs of the minimum flows that are specified in Table A?
A I don't believe so.
Q But again, we would need to see the output to determine that?
A Yes. We also are providing the output to the State Board on our Management Plan. In fact, they will have that shortly.
Q And what did you tell me about the ramping rates that you were inputting?
A Well. to come up with our flushing flow volume, we assumed 25 percent increase every eight hours, 25 percent of the previous days' flow.
Q And what about on the falling limb?
A 25 percent in 24 hours.

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Q And where did that 25 percent figure come from?
A Dr. Randal Orton.
Q Do you know of any scientific basis that supports it?
A I do not.
Q And are you aware that there is a publication out by Hill, Platts and Beschta that recommends a 10-percent ramping rate?
A Well, I know that that ramping rate was discussed, but I believe he testified that was not appropriate for the

Eastern Sierra streams and in fact, typically Eastern Sierra streams fluctuate in quite a wide manner and the 25 percent over a 24-hour period is not anything that is out of the range of historic hydrology.
Q To go back to the criteria again, what were the target storage levels -- you gave target storage levels, I think, for Grant Lake. What were your target storage levels on Crowley Lake?
A The target storage levels are different for each month, of course, and it depends on whether it is a wet, normal, or dry year, so the targets range from a low of 80,000 acre-feet in a dry year to a high of 170,000 acre-feet in a wet year.
Q So, the reservoir target storages do vary with the year type, with the stream flow, but the stream flow recommendations do not; is that correct?

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A That is correct.
Q And on page 37, under irrigation, Owens Valley Irrigation will remain unchanged from historical practices. I think we have already asked this afternoon, someone has, but you might tell me again, what is the amount of irrigation in the Owens Valley at present?
A It's in the neighborhood of 100,000 acre-feet applied irrigation.
MR. DEL PIERO: Is that all pasture?
A The majority of it, yes.
MR. DEL PIERO: What percentage is not?
A I don't know.
MR. DEL PIERO: Is the percentage greater than 5 percent?
A I don't think so.
MS. CAHILL: Q Let me go back one more time, just another way of asking something. I think we have already been over the table that gives the average minimum and maximum flows. Those are not stream regimes per se; are they?
A What do you mean by stream regimes?
Q I guess what I am saying is those are not recommended amounts for each month. If you were to try to operate the system, you wouldn't know from that table what the flow would be in any given month?
A No.

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Q Turning to Table D on page 43, this table shows that approximately two-thirds of the runoff from the Mono Basin would stay in the Basin. Is it true that most of that two-thirds would occur during wet years?
A Yes.
Q And some of those are years in which, in fact, you could not accommodate that water, lowering your system in any case; is that right?
A Yes.
Q On page 45, the second paragraph under Figure 5 states: LADWP will maintain appropriate reservoir levels for recreation, fisheries, and power production. Storage targets will also incorporate required flows in the Owens River Gorge and below Pleasant Valley Dam.
Let's take this in pieces. What is the appropriate reservoir level for recreation?
A For which reservoir?
Q Well, I assume that that relates to Crowley.
A I don't know specifically, but I know that when the fishing season opens, we typically like to have the reservoir above 100.000 acre-feet.
Q And what about fisheries, did you input an appropriate reservoir level based on fisheries?
A Well, we put levels that were consistent with levels at which they have been in the past 20 years. So, I don't

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know that we did anything special for accommodating fisheries other than what we have done in the past.
Q You didn't contact the fisheries biologists to ask about appropriate fisheries levels?
A No.
Q Do the proposed Crowley Lake storage levels reflect Owens Gorge water releases?
A No. The Crowley storage wouldn't change much from the Owens Gorge releases.
Q So. what does this sentence mean: Storage targets will also incorporate required flows in the Owens River Gorge and below Pleasant Valley Dam?
A Whet is meant is that when the final gorge flows are determined, that the reservoir will have to be operated differently in the future. and so if we intended to operate in a certain pattern, we could no longer do that because we lose a certain amount of operational flexibility with the gorge flows and then we will incorporate that when the flows are determined.
Q So, the runs you have done now, in fact, do not incorporate any flows in the gorge; is that right?
A Correct, because they have not been determined.
Q And what flows did you show for the region below Pleasant Valley Dam?
A They ranged, I believe, from a minimum of 200 upward,

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but I'm not sure of the numbers.
Q And where did the numbers come from?
A From our operations, our chief operator.
Q And do they reflect fisheries recommendations?
A I believe they do.
Q And who would have been the source of the fisheries numbers?
A Well, our chief operator works with people in the Department staff Who notify Fish and Game on these flows, but I don't know the exact person.
Q In terms of reservoir storage management, did you consider, then, in-reservoir fish production?
A No.
Q Did you consider water quality concerns?
A No.
Q Did you consider aquatic weed management?
A No.
Q Did you consider angler accessibility?
A No.
Q Was there any kind of a limitation on flows in the Upper Owens River under the L. A. Management Plan?
A Yes.
Q And what was that?
A The maximum was 375 cfs.
Q And does the flow below the Portal go above 300 under

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the L. A. Management Plan?
A Yes.
Q And does it go above 200?
A Of course.
Q Obviously. With regard to the Management Plan, were there any activities proposed to protect or enhance water quality in the watershed?
A Any particular watershed you were referring to?
Q The entire watershed that feeds the aqueduct.
MR. BIRMINGHAM: I am going to object to the question as vague because there are two watersheds that feed the aquifer.
MR. DEL PIERO: Sustained.
MR. HERRERA: 20 minutes.
MS. CAHILL: I would like to apply for additional time. I would ask for 20 and hope not to use it all.
MR. DEL PIERO: Restate your question.
MS. CAHILL: Q Does the Management Plan deal with management practices -- I have lost my train of thought here. As part of the proposed Management Plan, are there activities proposed to protect or enhance water quality in the Owens River watershed?
A No.
Q And there are no changes identified with regard to irrigation practices in the Owens Valley?

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A Correct.
Q What is the assumed capacity of the Mono return ditch on Rush Creek in the Management Plan?
A 350 cfs.
Q Does the ditch in its current configuration accommodate a flow of 350 cfs?
A No.
Q Do you have plans to enlarge it or to increase the capacity so that the Rush Creek and/or the ditch could carry 350 cfs?
A Well, we have plans to study what can be done to increase the capacity.
Q And what is the status of those studies?

A I don't believe they have begun.
Q Is there some danger that the return ditch might collapse or give way under flows higher than 200 cfs?
A Some engineers have concerns.
Q And what would happen if it did -- what would happen to the water in Lower Rush Creek if the Rush ditch gave way?
A Well, it would drop off.
Q And would that dewater the stream bed below?
A No, not necessarily. A failure of the return ditch would probably split the flow so some would be going down the return ditch and some would be leaking out.
Q Does Los Angeles have any plans to install facilities

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in the dam at Grant Lake to permit releases in the natural channel below the dam?
A Not above where the return ditch comes into Rush Creek.
Q What kind of maintenance activity does the Department carry out on Mono return ditch?
A We cut back the vegetation that's growing on the edge or into the creek that can inhibit the flows.
Q And are you aware that that vegetation might have value with regard to fish habitat?
A Yes.
Q And do You also clear aquatic plants that grow within the ditch?
A I'm not sure.
Q What provisions have you made to maintain flow in Rush Creek if there is a catastrophic failure of the Mono return ditch?
MR. BIRMINGHAM: Objection, assumes facts not in evidence.
MS. CAHILL: Q Do you have any plans to deal --
MR. DEL PIERO: Sustained. Go ahead.
MS. CAHILL: Do you have any provisions to maintain flow in Rush Creek if there is a catastrophic failure of the Mono return ditch?
A We have a large system and we have a device at the

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end of the return ditch, and if the flow were to drop off suddenly, then that would trigger an alarm at our hydrographic office and we would quickly rush to repair the damage as soon as possible.
Q Would you shut off the flow to the ditch in such an eventuality?
A I think we would reduce it. I can't say that we would shut it off.
Q Do your proposed flow inputs for Rush and Lee Vining Creek consider the flows that come down those streams from the Southern California Edison hydroelectric projects?
A Yes.
Q And are you aware of any agreement between Los Angeles Department of Water and Power and Southern California Edison regarding reservoir levels associated with the projects on those streams?
A Vaguely.
Q Can you tell us what you understand about the nature of those agreements?
A Near April 1 of each year, the reservoir storage will be reduced to a minimum and there would be no carryover storage from year to year in those reservoirs.
Q Could Los Angeles Department of Water and Power, through its agreement with Southern California Edison regarding Saddlebag Reservoir provide enhanced flows for fish

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resources in Lee Vining Creek?
MR. BIRMINGHAM: I am going to object to the question. It goes beyond the scope of the expertise of this witness, the same objection that Mr. Thomas raised in connection with my asking Mr. Gewe the potential of habitat along the Los Angeles River. Mr. Hasencamp is certainly knowledgeable in engineering and hydrography, but he is not an expert in fish flows.
MS. CAHILL: I think the Management Plan deals with inflows to the Los Angeles system and to the extent that Los Angeles has some control through agreements, existing agreements, over the pattern of those inflows, I believe this expert, if he is knowledgeable, should be able to answer the question.
MR. BIRMINGHAM: If Ms. Cahill wants to ask this witness hypothetical questions about what he understands the flows -- let me restate that. If Ms. Cahill wants to ask this witness hypothetical questions about what can be achieved with respect to specific flows, then I think this witness can answer that. However, the question is enhanced flows for fish habitat, and this witness has no idea what those flows are.
MR. DEL PIERO: I will sustain the objection. You can ask a hypothetical question.
MS. CAHILL: Let's ask him about the agreement.
Could Los Angeles Department of Water and Power, through its

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agreement with Southern California Edison regarding Saddlebag Reservoir require Southern California Edison to alter the pattern of flows on Lee Vining Creek?
A I don't believe so.
Q Are you aware that Southern California Edison is currently engaged in a relicensing process with the Federal Energy Regulatory Commission for Rush and Lee Vining Creek hydro projects?
A No.
Q So, to your knowledge, Los Angeles is not participating in that relicensing process?
A No.
MS. CAHILL: Let me consult just a moment with my clients and see if that's it.
(After consulting.)
That's all. Thank you.
MR. DEL PIERO: Thank you very much, Ms. Cahill.
Mr. Dodge.
MR. DODGE: May we approach the bench for a second?
MR. DEL PIERO: Sure.
(After a short consultation.)
MR. DEL PIERO: We'll go back on the record, ladies and gentlemen.
Mr. Hasencamp, it's 6:00 o'clock. Mr. Deas, it is 6:00 o'clock. Normal people go to dinner about this time. I

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think we all will. We will see everyone back here tomorrow morning at 8:30.
(Evening recess.)
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