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Round Valley v.
Twp of Clinton

5-7-77

Stenographic transcript of
trial proceedings (Robert Hordon)

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SUPERIOR COURT OF NEW JERSEY
LAU DIVISION,: HUNTERDQL^ COUNTY
DOCIOST NO. L-29710-74 P.W.
A-2963-77

ROUND VALLEY, INC., a corporation of the State of New Jersey,
Plaintiff,
vs.

TOWNSHIP OF CLINTON, a Municipal Corporation of the State of Hew Jersey, TOWNSHIP COUNCIL OF CLINTON, and PLANNING BOARD 'OF CLINTCN,
Defendants .

Stenographic Transcript of Trial Proceedings

Place:
Hiinterdon County Courthouse
Flemington, New Jersey

Date:
July 7, 1977

BEFORE: THE HONORABLE THOMAS J. BEETEL, J.C.C.

FILED
SUPREME COURT
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Stephen W. Townsend
Clerk

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TRANSCRIPT ORDERED BY:
ROGER CAIN, ESQ.

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OPINION FIL
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MR. STERNS: Your Honor, just one point. We have Mr. Pearson standing by.

THE COURT: We only have half a day.

MR. STERNS: I just wanted to point that out so that we could take him if possible.

THE COURT: Let him start about seven o'clock Monday morning.

MR. STERNS: Tuesday morning.

THE COURT: Tuesday morning, period.

MR. CAIN: If things go very well we may get to him, but I don't know how much time we will have this morning.

THE COURT: I gather that you want to cross-examine him first, or does Mr. Sutton?

MR. CAIN: I believe I will cross-examine first, with the Court's permission.

THE COURT: Of course, whichever way is easier for you, all right.

ROBERT M. HORDON, previously sworn, recalled.

CROSS-EXAMINATION JBY MR. CAIN:

Q Starting with the April 6 report, Professor Hordon, I don't know what number that has?

MR. STERNS: It is P-103.

MR. CAIN: Counsel indicated that they had

sent it to us. I went entirely through my file, and I am not saying you didn't send it, but I didn't find it.

MR. STERNS: 103, April 8, 1977.

Do you want to see it?

MR. CAIN: I have it.

THE COURT: Which one do you not have?

MR. CAIN: I have them all. I was just indicating that I couldn't find it in my file, but I was provided with a copy late yesterday afternoon.

THE COURT: Are you ready to cross-examine?

MR. CAIN: Yes.

THE COURT: Okay, let's go.

CROSS-EXAMINATION CONTINUED BY MR. CAIN:

Q Professor, you indicated in your April 6 report the population estimate of 9,744. Did that come from the Beaver Brook plan, or was that population estimate arrived from some other source?

A The population estimate was derived, the number of dwelling units was derived from the plan, from the Round Valley plan.

However, the estimated household size was derived independently from the reference Housing Development and Municipal Costs, put out by the Center for Urban Policy Research at Rutgers, on page 3 of the document table.

The reference is given as to where the estimated household size was obtained.

Q The reason I bring that up was that in previous testimony, I think the population has been estimated as around 10,550.

Would it then be because of a difference in the figures used for household size?

A Very definitely. The dwelling units of 3,559 was the household size which, when you multiply that, would give you that variation.

Q So then, for the purpose of an analysis, it doesn't make that much difference if the population were 9,744 or say 10,500, it is still quantitatively about the same conclusion?

A It would be the same, indeed I rounded upwards in my estimate for water consumption. But you are talking about something of the order of probably less than five percent variation, which would not be significant.

Q I just didn't know where the figure came from?

A Surely.

Q Now, you indicate that the demand difference between single family and garden apartments as related to lawn sprinkling and so forth, is that the primary difference then between additional water demands say for single family over the apartments?

A Yes, it is the external use. There have been a number pf studies that indicate that internal water use in addition to the number of persons, of course, would pretty much be the same. The large component would be how much external use, that is the lawn sprinkling. The usual references in this would indicate that single families would tend to use, would definitely tend to use more water than a garden apartment.

MR. CAIN: Out of deference to the Court, I apologize, that was Part 2, about the middle of the first page.

THE COURT: What page?

MR. CAIN: There is no page number. It appears to be the first page of the report.

THE COURT: You are still on Exhibit 103?

MR. CAIN: The first question as to the water supply for the Beaver Brook PUD.

THE COURT: Aren't all those pages numbered?

MR. CAIN: Mine aren't. Page one isn't, anyway. I am on page one, the middle of the page.

Q The- difference in the water demand among the various types of land uses contribute to variations in lot size and anticipated outside water use.

Now, in a PUD where there are various uses, garden apartments, townhouses and single family, would

there not be water sprinkling of the lawn areas regardless, if they are in a single family house?

A It would be logical to assume that there would be some sprinkling. However, again, it is generally indicated in literature that it would be less in magnitude than single family, simply by the lawn size, area being less.

Q The PUD Homeowners Association then would not sprinkle the larger lawn areas, common areas, as much as the individual owners would their own lot?

A They would, and that estimate was incorporated in the estimate for water consumptions by using the value of gallons per capita per day includes the lawn sprinkling for the garden apartments in the calculation.

Q Now, you assumed 100 gallons per capita per day. I suppose that means 100 gallons per person in the development per day, water demand?

A Yes.

Q You allowed us a small amount for commercial facilities?

A Yes.

Q There was something in the plan, or some talk in the plan about having a motel on the Beaver Brook side of Route 31 as part of the commercial facility, was there not, your reading of the exhibit?

A As one possibility, as I recall it, yes.

Q If that were so, what would be your opinion, as to water demand in a motel as opposed to other commercial uses? A At that point, since the actual water consumption as indicated in the record for communities in Hunterdon County would vary between as low as 75 and 125, by rounding to 100 gallons per capita per day, at this particular time, this was felt again to be conservative and would allow for the incorporation of the amount of commercial space that was indicated within the R.V.I, plan. So I feel comfortable with 100 gallons.

Q You feel comfortable with the 100 gallons a person a day, even if a portion of the tract was devoted to motel use? A Yes, right.

Q You indicated that the estimates were useful as a first approximation.

On page 4, Estimates of Cnsite Ground Water Sources, about the middle of the page.

A I'm sorry, I didn't understand the question.

Q You have indicated that the estimates of the onsite and ground water sources, this is about the middle of page four, part of four, are useful as a good first approximation as to what can be expected in various geological formations. Is that correct?

A Yes, that had to be, particularly in what is

referred to as the consolidated rock formations of the State. There-is so much variation because your estimate of the degree of fracturing, these yields would obtain what is called secondary porosity. The variation is rathei large and, therefore, the first approximation, that is the best term to use in that case.

Q Eie estimates, though, are not intended then to be accurate, they are based on overall geologic formations at large or rather small scale?

A Well, the State is very fortunate in ttet it has a law that requires well drillers to furnish records to the Bureau of Geology, which goes back 1947. There are now over 90,000 well records that come into Trenton. Based on the yield from these 90,000 well records, the Bureau of Geology more specifically is able to make some estimate of the yield and what they call m.g.d.'s per square mile. Now, these are in the Lord's reference or in the Lord's publication of the Bureau of Geology.

These estimates are made for every geologic formation in the State and other independent assessments have been made by U. S_{9j} Geological Survey personnel.

The figures tend to be fairly close, giving me, as the user, much more confidence in the estimates that are employed.

They do make the'two estimates as of now, the

drought year and the normal year, these would be, of course, the drought year being much, much more conservative on the low side.

Q What I was getting at then, the estimates which you set forth in Table 2 on page 6 then, are derived from a statistical analysis of 90,000 or shall we say different geological formations and are the best estimate that you have for planning at this stage, other than subsurface hydraulic studies on the site itself?

A As the first approximation, using the underlying geologic formations at this point in time, this would be the best information available. However, there is another route that one could employ,* that is to look at the well yields in the formation for the County or the State, either case, and see what the mean value of the yield is, and what the medium value of the yield is.

If you were to do that, then you would find that some of the formations are capable of handling or capable of yielding much more water.

Q Then are you getting to Table 3 on page 8?

A Yes.

Q Does then the actual study of these, admittedly fewer wells, bear out the results which Table 2 has, as provided by the State?

A Well, the summary, the well yields that were

indicated in Table 3 on page 8, were part of the body of data that, of course, was available to the Bureau of Geology. They employed other figures from other agencies of the State. Where the geology and ground water conditions were similar, they were incorporated in that. Then they attempted to arrive at an estimate of the yield.

In this case, the numbers that are available were buttressed, that is, the Lord's estimates, because if you notice on Table 3, for example, for Kittatinny limestone, there were eight industrial wells in the Kittatinny limestone at the time that the study was made in Hunterdon County. But the State had available to it other well yields from other formations in other counties, that led them to estimate the yield in million gallons, m.g.d.'s per square mile.

Q What I am getting to then is, it was a part then of the same data the State had, and it is supportive of the figures on Table 2? A Part, that's right, it was, of course.

Q That is really all I am getting to.

The only more accurate information you have then is the direct testing on the site itself, drilling wells on the exact site itself and doing some pumping tests and studies to determine what is actually there, that is all I am getting to, it is really very simple?

A But if I can clarify, there are other factors that would change -that, if you had additional information.

You are talking about subsurface information and we do have two other factors that we know about that would tend to make our estimates much, much lower.

Now, that information, it cannot be quantified exactly, but I would like to clarify, that the presence of fault throughout the site and the existence, or the planned existence of ground water recharge basins would mean that the yield from the site could easily double or triple. But the exact magnitude of that simply could not be stated. However, it could be doubled or tripled on the site by virtue of those two pieces of information that we know will be – that is the fault and the ground water recharge.

Q You led into my next question in terms of estimated yield. Does yield take into consideration recharge? A The term "safe yield" would be defined and there would be no objection in the standard references to this. The term "safe yield" would mean^that amount of water which you can withdraw from either a reservoir or a ground water source, a ground water aquifer, without diminishing – to quantify that, it will relate to the precipitation. The amount of precipitation that will infiltrate through the

overlying soils, and then into the underlying aquifer, is a water, bearing geologic formation.

If, the presence of detention systems or possible recharge basins would increase that because of the amount of precipitation, it would have done that as storm water runoff. The surface runoff that is now being deflected or now being diverted, is now being given an opportunity to infiltrate, so the yields then can increase.

Q Then what you are saying is that the yield, for example, in the last column of Table 2, in 0.181 million gallons per day, for example, in a dry year, that does not assume any man-made detention, but is depending upon the natural recharge? A Yes. That assumes only natural recharge based on the precipitation of the region.

Q So then, any time that you can do some man-made retention, you help absorption and increase recharge, is that your point? A Very substantially, depending upon the size, of course, of the recharge basins.

Q Now, I note from that same table too that there is a relatively small amount of Kittatinny limestone. I think you testified yesterday that was the best water producer relative to the small amount on the Goble tract, shown in Table 2?

A Well, the RLttatinny limestone –

Q 1. Ninety two acres, for example, out of 790, which seems to be a relatively small proportion, but that is your best water producer. Is that correct?

A The 92 acres are Leithsville, L-e-i-t-h-s-v-i-1-l-ej. a member of the Kittatinny limestone, which is one member of the Kittatinny limestone. That is really more of a Dolomite, but we consider it a limestone for this purpose.

Also, other members of the lower Allentown and the upper Allentown, would have to be included. Indeed, one would want to include the Rickenback and Eppler. I am not sure why one would want to restrict the other members of the Kittatinny limestone. If you take the area that they would consist of, it is much more than the 92 acres.

Q It is just that you indicated yesterday that the Kittatinny limestone was the best water producer.

MR. STERNS: If I may, I don't understand, are you looking at Table 2?

MR. CAIN: Yes.

MR, STERNS: Aren't there five different Kittatinny limestones listed?

THE COURT: I see everything from Kittatinny lime, Eppler, through Leithsville. I can see a

total of like 300 acres or more than closer than 92. If I had ray calculator I could give you the exact amount.

Q I guess I was referring to the Leithsville as being the best of the Kittatinny limestone. Where on the site is that located? A The Leithsville would be on the Goble tract.

Q Would that be in the area of the fault?

A That is in Rahenkamp's 12/73 report. There is a color map in there at a scale of one inch to 4,000 feet. Do you mean a map view?

Q I just wondered, I believe you said on this, those were arranged in a west to east direction going across the Goble estate. So then I was assuming that —

A This would be a profile view of the Leithsville.

MR. STERNS: This is P-82.

THE WITNESS: In P-32, the Leithsville is shown in profile view as being next to the Allentown, lower and upper part. There is a map that was prepared of the scale of one inch to 4,000 feet. That^is in Rahenkamp's Planned Community Report, which has the map view of what the Leithsville is, the relationship to Route 31.

THE COURT: He wants to know where Leithsville is.

Q I want to know where on the overall tract where your best water producers were, I guess that is the same question?

THE WITNESS: May 1 get that?

THE COURT: Yes.

What is that, Esshibit Wo. 1?

MR. STERNS: It could best be described as Section 3, Site Criteria, Geology, the section headed Geology. Right after that is the map, the first map in Section 3.

THE COURT: Could you identify it, Professor, for Mr. Cam, perhaps make a little circle around it?

THE WITNESS: There is no figure, the map is labeled Geological Map of the R.V.I. Site in Raheakamp's "A Planned Community."

The various formations which I used to obtain the estimates were derived from this map that was in the report.

THE COURT: Could you circle that for Mr. Cain, in red pencil?

MR. -GAIN: That isn't necessary, it is obvious on the chart based on the color.

THE COURT: How that you looked at it, where is it?

THE WITNESS: It is on the Goble tract, on the east tract, in the middle of the east tract.

There is a different color for each one. Leithsville is dark. All of this is Kittatinny, but there are different shades and there are various members of the Leithsville formation, which Mr. Cain mentioned is the most productive member. But all of the limestone would be considered a good aquifer.

THE COURT: All of the blue, whether it is dark or lighter?

THE WITNESS: Yes, right. But the various divisions are because there are various members of the same Kittatinny limestone. It is a subdivision of that, that is xrtiy it is light blue and dark blue.

Now, the browns and yellows are different formations, the Martinsburg shale, those are separate, they are less productive aquifers.

They are aquifers, they are not impervious, that they can penetrate, but they would be considered less productive.

The estimates, for example, would be about half, approximately, of the productivity of the limestone, approximately one half.

THE COURT: We have 92.1 of Leithsville acres, we have got 57.8 of Kittatinny limestone, lower Allentown. You have 122.2 Kittatinny limestone upper. You have 74.7 of Kittatinny, Rickenback, and 22.1 Kittatinny limestone Eppler, or a total of 369.9 acres of Kittatinny limestone. Do I understand that is all contained in the Goble tract?

THE WITNESS: Yes, it *is* all in the Goble tract. The western tract does not have the limestone.

THE COURT: 368 acres, Mr. Cain, of limestone, and the Leithsville is' 92.1.

Q When I originally referred to a small portion, looking at the Leithsville instead of all of the Kittatinny, I can see your point. You are looking at 92 as compared to 792 and saying, looking at the proportion of 368.9 as compared to 792, it is all in the Goble tract, so that was the exact opposite of what I thought it was.

Referring to page 5, right before the chart, you indicate that you rely on those factors, A to C. You say, however, it could be stressed that several factors could substantially change the onsite ground water estimate as follows. Then you have A, B and C, i.e.,

the detention basins which we already addressed ourselves to, B was,- if a portion of the treated effluent were to be used for spray irrigation and ground water supply would be increased, you indicated, lower on the page, that is beyond the scope of the report, to quantify the magnitude of the factors. A to C, which you appear to rely upon then is a basis for increasing the yield of water? A Oh, no, not quantitatively. Let me clarify that, please.

The Lord's estimate which was derived from making an aerial determination from the map in P-l, in the geology map, this does not take, into account detention basins nor the spray irrigation, nor the fault in its estimate of 182 to 175,000 gallons.

Q Then what you are saying is, if I understand it, is that you don't have any quantitative indication of the amount by which A, B and C could increase the yield? A No, I don't. Each one would operate independently or accumulatively, which could then double or triple the actual yield.

Q Would you think it is likely that you are going to have spray irrigation in the PUD of this type? A Spray irrigation, as 1 understood it in a preliminary way, was to be a possibility on the golf course tract. This has now

been employed in a number of golf courses.

The East Windsor Municipal Utilities Authority in Mercer employs sprays about one m.g.d. of effluent during that portion of the year, the non-winter portion of the year, on their municipal golf course. They have had good results with that and, thereupon, diminished the flow to their treatment plant.

The Rossmoor Leisure World has spray irrigation in Middlesex County, there are a number of examples.

Q Considering the weather factors and my knowledge of golfers, that they seem to play golf in all kinds of hours of the day, how are you going to reconcile spraying the stuff around when people are out there playing golf? A Spraying could be done with spray systems. For example, there could be automatic sprinkler systems which could be adjusted. It is done in certain developments during the night period. Of course, you wouldn't necessarily have to have all of it going twenty four hours a day. Obviously, you couldn't spray and play golf simultaneously.

Q Taking into consideration the weather factor and the time of the year, winter and so forth, to the fact that it is effectively limited to the nighttime, just how much are you going to achieve by spray

irrigation? A Here I refer to the results or the studies at Penn State, which is a similar climatic region.

They have had spray irrigation using effluent, that is from the State College in Pennsylvania, where the students stay at Penn State. They have incorporated spray irrigation on an around year basis on their fields and forests as, again, part of a ten year continuing program of spray irrigation.

They have been able to, for example, to continue through the winter, since the effluent that is coming out is flowing at a fast enough velocity not to freeze, given the climate of central Pennsylvania, which would be, of course, broadly similar to what you would have in western 11ew Jersey.

So I would not thing that that would be an impediment to a solution or a design. That would be up to the particular hydrological engineer, to be sure that the design has sufficient velocity so that it won't be flowing very slowly in the pipes.

THE COURT: This is treated effluent that you are talking abou,t and what would you propose to do, send it all the way into town and bring it back?

THE UITNESS: This has been suggested in

a number of waste water management schemes, whereby the effluent to be sprayed, must be treated to what is called a secondary level. Since the distance is only within several miles, you can then pump that back onto receiving lands and then —

THE COURT: That would require a loop system, not just leading to the plant but leading back from it?

THE WITNESS: Very definitely. This is a much more imaginative approach in waste water management. Instead of putting all the effluent into a receiving watercourse, one alternative would be to take a portion of that back and into spray irrigation which, of course, would then recharge the ground water. You can do it for a portion, you can do it for half, you can do it for all. It would depend, of course, on a particular area.

THE COURT:. There is nothing I recall in the plans so far which would have any type of treatment plant onsite, is there, or have we missed that?

THE WITNESS: One alternative would be, of course, to have a package plant, the so-called

package plant, for the subdivision, onsite. This would seem to be a little bit improbable, given the proximity to an already existing treatment plant of the Town of Clinton, only within a few miles.

Therefore, it is a possibility that could be mentioned, but I would think that would be a little bit improbable, given the size of an already existing treatment plant with capacity and high treatment levels.

THE COURT: All right.

CROSS-EXAMINATION CONTINUES BY MR. CAIN:

Q Referring to page — one follow-up on my next question, that you have partially answered. I am taken to understand that spray irrigation was usually done in such a way that I hadn't realized that they had pumped it back from the sewer plant to the site for spraying? A The spray irrigation, if I may just elaborate briefly, spray irrigation is a relatively new kind of waste water treatment technique. Therefore, the number of installations, of course, in the State, and it is spreading, is somewhat limited. There are probably about a dozen, but it is now considered by E.P.A. to be a valuable alternative in all future plants to incorporate as much

spray irrigation as possible. It was employed by Roy Westojn, who was the consulting firm for the Stoney-Brook Millstone Regional Sewerage Authority. They had to look at many different things. This was for Hopes?ell Township and Princeton Township, etcetera, which would be a suitable spray irrigation. There were certain areas where the soils had requisite infiltration characteristics.

Q While we were talking about the water report, I hadn't really intended to get over into the sewer aspects of it, but the spray irrigation came up, perhaps I could hold some of that for later.

On page 9, Professor, 1-B. indicating the per capita consumption, would that indicate the per capita consumption in 1976 for the estimated six, 700 users of the Town of Clinton water supply?

A From, that capita consumption was derived by obviously dividing gallonage by estimated population served.

Q Then that is an actual figure then based upon the record of the water supply company?

A For that particular year that was put down, that was the most recent year.

Q That's all I am getting at. In 1976, that then was the actual use per capita of the 700 people?

A No, that was the estimated. The difference between that — I am. doing this for another part of the State v?here

this issue was very, very much of concern. That unless you have a census value, that is, an actual, 1960, 1970, 1980 value, these estimated populations served are really estimates and the error can really be substantial, particularly when the amount of the water is in the order of two to two and a half m.g.d. Yes, that was the best estimate, and I would have to stress that that is an estimate.

Q I just wondered why if Clinton Township's figures were 127 gallons per capita daily, that you used the 100 as your design standard in your earlier calculations, why not the 127, which is the experience of the Clinton plant? A The reason for doing that is that a study was made in the process of preparing a report of communities around.

There was a mix of communities that was taken to be, that I thought would be helpful in arriving at an estimate. It shows that the communities range from 75 to 125 gallons per capita per day. In a good sense that would be a reasonable estimate.

More standard references suggest using, in the absence of very, very specific data, using 100 gallons, using the 100 g.p.c.d., or gallons per capita per day. By taking 100 this was felt to be useful as an initial planning; was felt to be certainly conservative and very, very reasonable in that.

So, therefore, the Town of Clinton was one of the areas which was used in order to look at the range of water consumption within what you might call the region surrounding Clinton and Clinton Township.

Q Then there may be other areas which were taken into consideration in the overall region and where there may have been more than 75 gallons per person per day? A Yes.

(i But actually, the Clinton Township users right in our area, then would be more appropriate, wouldn't they, to a consideration of the development right in the middle of Clinton Township? I don't want to belabor the point, but that figure is about 20% higher than the one you had, than your 100 gallons per capita daily. Does that mean that the population estimate is that far off from leaky pipes? A Yes, the population met the --logically and simply, one would like to use an existing facility that is close by. But the range in that estimate was so substantial that I couldn't even plot that as a graph, which was, you know, the graphs on Figure 1 and Figure 2. Because the estimated population, sir, varied so much from year to year. If that were 1970, a census year, I would have been much more prone to use that, or 1960. But given, 1976, I felt it would have been more reasonable to use the average of the range of consumption

within the Hunterdon County region around the Township.

That 127 gallons per capita per day was put there to indicate that it was the most recent estimate, but it is only an estimate. I would not feel happy in using that value unless that was a census year.

Q I believe one of your charts indicated a higher usage for demand back around 1970 or 1971, did it not, one of the peak diversion years back around '70, '71?

A Yes, on Figure 2, page 20, there was a maximum monthly diversion that went to 1.15, approximately, still well under the diversion rate of 1.85, but it was higher during 1971, yes.

Q Then I suppose if we had taken that figure and the '70 population, we might have come out with something higher than 127 gallons per person per day?

A Ho, you wouldn't use the maximum monthly diversion. You would use Figure 1, that is the average annual consumption which was under 1-0 in 1971. These are the rules of thumb, these are the standard operating procedures in making the estimates.

Q So we are dealing with approximations and it is difficult to pin them down until we refine them to a precision? A Except for the gallons diverted, that presumably is an accurate value.

Q However, you are not testifying that the 127

gallons per person per day, you are not ruling that out as an actual consumption, though? A No.

Q You are just not going to use it as a design tool? A No. It was used in one of the communities in the region, which gave me the range.

If Clinton Township was 200 gallons per capita per day, I would have had to incorporate that. Therefore, my estimate probably would have been higher than 100, it might have been 105, 110.

Q I don't want to belabor it, I was just trying to get to it.

All right. You indicated the maximum diversion rights which I believe" are shown on page 13 of the Water Supply Council, 3/17/70 edition, total diversion right granted for maximum, 1.85 million gallons per day during the month. Is that the figure you were talking about yesterday?

THE COURT: Page 10?

MR. CAIN: Page 13, middle of the page. Maybe it is some place else, too. I just happened to see it on page 13.

THE WITNESS: It is at a number of places.

Q It is also on page 9(1)(c), isn't it?

A it would be in a number of places, it is a rather

important number.

Q " I believe that you indicated that there was unused capacity or diversion rights or however you want to call it, in the Clinton system. Is that correct?

A I think we wanted to distinguish between the diversion right, which is a right granted by the State to a water purveyor.

Q Let's use that.

The 1.5, then, you were taking that and some calculations, and you indicated that there was still some diversion rights available for the Round Valley project?

A In essence, the system, the purveyor, has unused rights that are about 0. — well, they are running now about 0.9. They have about another one m.g.d. before they would exhaust their rights. Actually, there is no problem if they exhausted their rights, they can go ahead and petition the Water Policy and Supply Council, as any other purveyor does on a routine basis, for an additional 0.1, 0.5, one or five.

The records in Trenton indicate that this is a routine procedure-. Then the State will decide whether or not the rights can be granted.

Q I think you said that the Town of Clinton, on page 15, had existing diversion rights to furnish about .87 m.g.d. or about 79% of the anticipated maximum monthly

demand for the PUD and that you would intend to get the remaining- .23 m.g.d. or 217o, from onsite supply?

A That would be one alternative that would be open from onsite supply.

The Town of Clinton could also, quite properly, petition for an additional 0.3 m.g.d., since they have rights to water within the Township. 1 think it would be a rather routine procedure, given the size of the TownshLp.

Q .. But within the 1.85, without any increase in diversion rights approved by the Water Supply Council, the anticipated population of this development would more than use up all the remaining diversion rights of the entire Clinton system, would it not? A In that case, yes.

Q I am looking at that table back on page 9. It would appear that six, 700 people had a diversion of under one, 0.919, 1976. I believe you indicated a few minutes ago, a diversion of 1.138 in 1971.

THE COURT: You are not coming through, you are not clear.

Q Preferring to page 9, paragraph l(d) the average annual diversion of 1976, 0.351, which 1 understand was an estimate since there was no census, you want to assume? A No, no, that was the actual pumpage that the Town had out of the ground,

read by meters, a series of meters. So that would be a very good number.

Q Then (e), maximum monthly average diversion, 1976, 0.919, that is where 1 indicated you pointed out on your chart, which was Figure 1 or Figure 2, where you had a 1.3S? A 1.3.

Q 1.138 in 1971. Is that correct?

A Yes, and that value from 1(e) is merely a plotted point, of course, in Figure 2, yeah.

Q So then (e) gives both the maximum monthly average of diversion, 0.919, that is the maximum of record, which was back in 1971 of 1.138?

A I'm sorry, I'm not quite sure what the question is.

Q Well, if, Professor, as you indicate on page 9(l)(e), you have a maximum monthly diversion in 1976 of 0.919 and then back in 1971 where you had a record of 1.138, you really don't have as much left as you are saying here, do you? In other words, does the Clinton plant really have enough to supply 79% or 0.87 of your water use, that is really all I am getting to?

A Oh, I see, by taking that. In that case, okay, the statement that was made about the water use on page 15 was based on the most recent period, yes. If you were to go back in 1971, that would diminish that by another certain percent.

Q So then you might need more onsite water than the 21%? ' A In the context in which you raise it in, yes. In that case you might need more. But looking at it from the Water Resource point of view, giving the magnitude of the ground water availability within the Township and the right to divert that water, you are talking about four to seven m.g.d. as a minimum available in the Township.

I couldn*t see how the State could possibly turn down a request for an additional diversion. They are under what would be a very extremely low and conservative estimate for the Township. So I see that as no constraint.

Q Do you know how much the water supply, which is supplied by the Clinton Town system comes from the wells in Clinton Township which depend on the Clinton Township yield? A The individual wells, page 13, Summary Table 3, has diversion grants for 0.9. GLcay, the applications — oh, there is quite a few. Most of the wells that are in the Township, actually that would mean that 0.9, plus 0.3 is 1.2, plus 0.3. It is about 1.5, approximately, m.g.d. I am just adding and rounding, of the 1.85 diversion grant applies to wells in the Township.

Q Do you know how many users there are of the Clinton Town water system in Clinton Township?

A How many users are within the Town of Clinton?

Q ' Township of Clinton.

Perhaps I can start in the back and work forward. Based on the fact that most of the wells are in Clinton Township, is it not a fair assumption that other municipalities now may be using our water yield or water supply, even though it is the Township of Clinton water supply, they are taking the water outside the Township for other users of the system? A In other words, are other communities, are other municipalities?

Q Yes,sir. A Do other municipalities such as Readington Township, do they have wells in Clinton Township?

Q No, my question is, is water from Clinton Township wells, which is tied into the Clinton Town water system, going out of the Township into other municipalities served by the system? A No, the only two users are the Town of Clinton and Clinton Township, to the best of my knowledge. There are the State institutions, but I don't think you can call them — they are not separate municipalities.

Q Then Clinton Town is not drawing any water from Clinton Township's wells for Clinton Town users?

A Can I refer to a document? What I am looking at now is, I am just referring to a reference that will

give me the exact population.

Okay. • I thought I had the exact number available and I don't know the exact proportion that would be furnished. It would seem that the —

Q I was assuming, Professor, that this was a system and that the wells contributed to the supply. You don[f]t have a reservoir, for example, and just very simply,.you have referred to the water yield in Clinton Township now as 4.6 million gallons?

A As a minimum.

Q In a dry year. All I am saying is, that is not part of our water yield already now going out of the Township to other people who are users of the Clinton Township system by Clinton Town, putting wells in Clinton Township to take water into the system.

Since we have the majority of the diversion rights and the production of water in the Township, is not some of our water serving other municipalities, maybe?

A The Township water?

Q Yes, the Township's share of the yield, we are talking about the Township having 4.6 and having lots of water. My simple point is, isn't some of it already going out of the Township? A To the Town of Clinton?

Q And whatever users they may have?

A Yes, the systems are connected, yes.

THE COURT: If you follow it up then on Summary Table 3, you indicate that the total diversion grant, just on one, is 1.85, isn't that true?

THE WITNESS: No, that is the cumulative on page 13. The extreme righthand column, merely accumulates the individual well grants, that is as of now.

THE COURT: Your figure in the rear showed a 1.85 figure, I gather that is the total diversion rights, 1.85?

THE WITNESS: Cumulative.

THE COURT: The nearest they come to that as Mr. Cain pointed out, is something like 1.13, or something like that?

THE WITNESS: Right.

THE COURT: But his point, I think is, it is a little different to understand here, that there are one, two, three, four, five wells, I gather that are in Clinton Township, and only one in Clinton Town, because they started in 1922, but with the Beaver Brook as the original source, I gather?

THE WITNESS: Yes.

THE COURT: That is their history. There is

one, two, three, four, five sources of water in .Clinton Township. He is saying that only, 1 gather, .6 - is it, or is it .5 - was drawn for the well, or .2 is drawn from the wells in Clinton Township?

THE WITNESS: Well, here.

THE COURT: He is saying that there is 4.7 millions of gallons per day, and he is saying that they are now using 4.7 already.

Q I wasn't saying that we are using it. Our yield is 4.6 million gallons per day, which is an estimated total yield for a minimum dry year. That is one of our charts that shows how much water is available in the Township.

You have used 1.8 or something like that for the Beaver Brook tract. My point simply was, that that shows what we have available, that 4.6. The water system, on the other hand, seems to have some of its sources outside of the Township of Clinton. As a matter of fact,isn't some of Clinton Township's water going outside of the Township? In other words, how much are you drawing from the 4.7 million gallons per day, how much are you drawing down based on the present usage on the table, how much are you drawing down already?

A There are several things, there are several things

that are floating around. The records do not indicate in Trenton the individual pumpages. They indicate a cumulative, and this is done on a quarterly report as required by the State.

So, therefore, what one obtains is an average annual diversion and a maximum monthly diversion, which is cumulative on that basis.

The amount that is forthcoming from the individual wells in the Township, is not reported nor is it required to.

THE COURT: We are not talking about — you are saying that there is 4.7 available. How much is being used right now of the 4.7?

THE WITNESS: Out of the 4.7?

Q 4.6? A 4.6, which is a very, very low estimate for the entire Township, as compared to the seven, which is the average yield for the Township.

You are using now, going to Figure 1, you are using less than the average annual, which is the value you want to use, on page 19. We are running under one m.g.d. for both Clinton Township and Clinton Town.

So, therefore, I would say that if you were to take the value of 4.6, even taking the 1, you still have either 3.6 or 6.6 m.g.d. available as your first

approximation?

THE COURT: How much of that do you need for your site?

THE WITNESS: The site needs one m.g.d. and the Township has been four and seven m.g.d.

THE COURT: So now there is 2.6. I gather, taking the 4.6, minus the 1.3, leaves another 1.26 for reserve, in reserve?

THE WITNESS: For any other purpose.

Q You don't know how much is being pumped out of that yield by the individual well users who aren't in the Clinton Township system?

MR. STERNS: Your Honor, on two or three occasions, counsel has indicated that it is going out of the Township.

MR. CAIN: That wasn't the question here.

MR. STERNS: You are not referring to anything about Clinton Town and Clinton Township, or are you suggesting that it is going beyond those two municipal jurisdictions?

MR. CAIN: That wasn't the question.

THE COURT: There probably is some connection.

MR. CAIN: The question is, does he know how much is being pumped by the folks in the

. Township who have individual wells.

THE WITNESS: Okay. The magnitude of the individual well, probably those individual or domestic, the smaller domestic wells that are not on the public system, are on septic systems. So, therefore, you have a return of a very substantial portion of what would be pumped out. The exact magnitude, I think, would be rather small. But you are talking at least 75% of whatever is pumped out would be returned, which is a standard value for septic systems. The remainder being, of course, any lawn sprinkling. The only loss is evapotranspiration, everything else would be returned to the ground.

Q Now, when you say what is returned to the ground, you are assuming that that is going to get back into the aquifer with the high quality,or does this same recharge have pollution dangers from septic systems? Are you depending on septic systems and recharge, don't you have dangers with pollution to aquifers?

A Depending on the density. The septic systems, yes, could tend to degrade the ground water. But that depends on the density. But the septic systems are not involved on the Round Valley site and, therefore, were not considered.

Q Yesterday, you were talking about Mr. Reilly's report, I suppose we will have a chance to chat with him later, of water budget or whatever it is, which, 1 believe you said, Professor, was not practical or not feasible on a subdivision level, I suppose a tract by tract basis.

You indicated on a municipal or county level that there were supports for the theory?

A Again, as a reply — excuse me, to reply to you, there is no regulation, no law or ordinance at this point that 1 know of, that requires only the water available at the subdivision level to be used in the determination.

Indeed, there is no regulation that I know of, in any State, that requires it at the municipality level. Indeed, there is no regulation that requires that at the county level.

Probably, the only example would be the State, and that is the State of New Jersey has specific laws which go back to 1905 that no water could leave the State, no fresh, potable water could leave the State. So, therefore, the scale becomes of great concern here. Although there are some municipalities and counties that are considering this and thinking about this, it has not been adopted.

I mentioned yesterday the Boca Raton case where the community, Boca Raton in Florida, attempted to adopt that for the land area of the community. That decision was

turned down, that is, that the community could not ignore the existence, of outside community boundaries, and that is a large community of Boca Raton in Palm Beach County, in satisfying a demand within the municipality.

Q You indicated that if a municipality were large enough, then this could be supportive, this theory; is that correct? A Well, it is a philosophical question rather than a physical question of whether or not — it would seem to be somewhat unreasonable, unless you go to a very, very large area. Because what you would be doing then would be saying that you could not enjoy or have any cluster of communities, even if it was as small a community as several hundred people. Simply, you would have to have only isolated farmsteads, if you consider that principle entirely, if you follow that logically through.

Perhaps at the State level, because of interstate regulations regarding water, that would certainly be more viable. Even if the Army Corps of Engineers within its plans disregards State boundaries and institutional barriers constricting water flow in their plans for the North Atlantic Rejgion, New York, New Jersey, region, which calls for massive transfers of interstate water and Hudson River water to go into New Jersey. New Jersey does not have riparian rights to Hudson River water. Even at that

State level, you see, there are difficulties supporting that.

Q Which would you say, that using the yield for the community as one of the elements to take into consideration in zoning for the municipality, is a reasonable zoning tool? A Yes, one could adopt that position, although one would have to recognize that the community may possess more water than just ground water. I think logically, or hydrologically, how you could separate the ground and the surface water is difficult. If you possess a means of augmenting the yield, the State has done that in the form of reservoirs, then one would certainly feel that perhaps it is certainly reasonable to assume that perhaps part of the yield from reservoirs in a community could be used for the community.

Q I believe you said yesterday that the area down in the Passaic, Hackensack, Newark area, half of the population of the State was in that area. When you were talking about-that second chart, I don't know the number —

THE COURT: P-105.

Q P-105, I believe you indicated that that heavily populated area was dependent upon our watershed up here to supply water to those populous centers. Is that correct? A No, the passaic basin and the Hackensack basin, which have about 4,000,000,

or more than half of the population of the State of New Jersey, they are getting now surface water only, ten m.g.d. from Spruce Run, Round Valley, really from the Raritan, by the pipelines of the Elizabethtown Water Company, through the City of Elizabeth, where Newark which is, of course, in the Passaic basin, picks that up. That could be augmented or that could be increased very, very easily, and certainly as of now there is ten m.g.d.'s.

Q Then in effect, that heavily populated area in a different basin is, by inter-basin transfer, I believe you were one that figured that there may be more inter-basin transfers necessary in the future, are you not? If that is true —

MR. STERNS: He asked a question and did he give a —

MR. CAIN: I didn't finish the question.

THE COURT: He is in the middle of the question. If it is not comprehensible, if it contains four or five questions, as I suspect it does, then you may wish to ask a question you would like him to answer first, but go ahead.

Q One, there is now some inter-basin transfer between our basin and the Passaic? A Yes.

Q Correct? A Yes.

Q Do you anticipate that with the population

growing or with the projected population in the Passaic basin, that there may be need for more inter-basin transfer from our watershed into that watershed?

A The answer to that is that it would depend[1] on applications which are pending for intra-state or development within the Passaic basin.

There is pending before the State now an 80 m.g.d. project called the Two Bridges Project, where the water yield of 80 m.g.d. is rather a substantial increment to the Passaic basin and where 40 m.g.d. will go to the Hackensack basin and 40 m.g.d.will go to the north Jersey district. Were the decision to approve that, would satisfy the immediate need for water. That is one very definite possibility.

To answer that, yes, there is that possibility. The forty eight inch connection between Elizabethtown and the City of Newark, which now has an annual contract of ten m.g.d., could easily be doubled hydrologically 20 m.g.d. or 25 m.g.d., without major pumping reconfiguration, but it would depend upon what is the disposition of the case in which the city of Raterson is now engaged.

Q As a practical matter, which is more likely, the inter-basin transfer via Elizabethtown or this other Twin Island project? A Both, because the city of Newark still has a favorable range. Because,

they can purchase, the water from Elizabethtown at a favorable wholesale rate and allow their Pequannock Reservoir, they tie it into the operation of their Pequannock system. Certainly, they will continue the 10 m.g.d. and maybe even increase that, since they are a wholesaler of water to other communities, that is part of the Newark budget.

Q You would say that more water is likely to come out of our basin than coming in. Is that correct, are we to get any inter-basin transfer into our system?

A That would, again, depend. This policy of allocation of the State, for example, there is a reservoir project being proposed in Monmouth County, which could furnish water to portions of eastern Middlesex County, which would bring it over into the Raritan basin. So, therefore, water could be brought in,

I have to use the term "could" because obviously the reservoirs have not been built. I would say that, very definitely, you could count on at least 10 m.g.d., which is a rather small amount for an unused allocation of the basin, going to Newark for another series of decades. That would represent no problem.

Q How about the population demand in our own basin, for our own water? A In terms of an unallocated portion?

Q Yes, sir, the areas down in the area of New

Brunswick and other populous areas, down that way, I believe Perth Amboy? A ' Perth Amboy, yes.

Q We just had the Oakwood at Madison case. I assume Gakwood is in our basin, there seems to be a lot of population down that way? A Yes.

Q How about the demand over there for water which starts up here? A They would have to come — in that case, part of it can come from the ground water reserve of eastern Middlesex County. But there is a problem there because of saline and intrusion of eastern Middlesex County. A portion could probably come from surface water generated by the basin from Round Valley and Spruce Ran.

I agree with you, one could count on an increasing consumption just as population increases within the basin. Of course, the entire red area.

Q The more we have to send down the basin, to supply the higher population, then the less we have for concentration of population in our area is not correct? A That would be internal, that would be within the basin allocation. But there are projects, for example, that one could not ignore, the six mile run project along the D & R Canal, which would have a yield of 38 m.g.d. They have completed a large amount of land acquisitions. There is a rather large amount of input that can go to the

lower portions of the Raritan basin. The confluence reservoir in the central part of the basin, with a yield increment of about 50 m.g.d. would also be included in raising the entire yield, raising the spillway, raising the ring dike, which could increase the yield another 25 m.g.d. That problem has already been considered by D.E.P.

Q Hasn't the Water Supply Council made a recommendation to the Commissioner that the Upper Highlands be deemed critical to our water supply, the Upper Highlands of the Raritan, that would be as the source region, that would be a headwater region, are you aware of that?

Now, in view of that, do you think that prior to the study which you are working on, being completed, do you think that it is likely that you are going to get any more diversion rights or any in this area, out of the Water Policy and Supply Council?

A Ground water or surface water diversion?

Q Any, in the area above, say the Hamden outtake or the Hamden pump? A Above Hamden?

Q It is the upper region of the basin, on the position that you are taking now?

A I would think that it would be reasonable, yes.

Q Pveasonable that they will or will not grant additional — A That they would

grant additional.

Q •. Even though they determine it U to the State's water supply? A This opinion, obviously, not being on the Council, I we can and does change, of course, and does change its opinions.

Q The study which you mentioned in your qualifications that you are involved with, can you briefly tell us the nature of that water study?

A Was that the comprehensive State-wide master water study?

Q Yes. A The first one was the 1955 State-wide water plan. Then the new one is this one, the .05 million dollar study that was authorized essentially done in 1977. That is a three year study period and it is now,as I said, under way.

Q What information will they produce which will help municipalities such as Clinton Township in determining whether they are getting too much development in a particular area or too much demand on water resources?

A There are^ about a dozen items that might be forthcoming, because since the study isn't finished, of course, one couldn't predict exactly. It would be the whole question of looking at yield, which is a hydraulic question and what is design drought that one could incorporate.

Should you be conservative, should you ignore the drought? Is there a probability that it would never occur again? Then your yield from the reservoirs will go up and institutional arrangements will be addressed such as an inter-connection between systems. Which would mean that then one system might be able to supply another systen much more readily. Inter-basin transfers will be another one.

Another area that should be looked at with a study of this magnitude would be incorporating what reservoir management is, so that areas or reservoirs that are close to spill could release water, and others that are less filled, given the variations in the storms that occur throughout New Jersey,, that you could optimize the production of the reservoir. This might be a recommendation.

Q You have indicated earlier that there are no controls with respect to the allocation of the water, for example, such as Mr.Pveilly had in mind,to use a method such as the water budget idea. What can a municipality do then, what can a municipality do, since it can only control its own municipality, what can it do about demands on its water resources? How can you protect your water resources for the future, recognizing you have your own in Clinton Township, for example, plus you have headwaters of a basin, which is goirg to supply heavily populated

areas downstream. What can a municipality do in the face of an application where somebody wants, to come in and put 10,500 people in a municipality?

THE COURT: We will break at that question.

(Whereupon, a short recess takes place.)

THE COURT: All right, Mr. Cain. I am sorry for the interruption.

MR. CAIN: I think we are in the middle of a question?

(Whereupon, last question read by the reporter.)

THE COURT: Break it up in parts, there are five questions.

CROSS-EXAMINATION CONTINUED BY MR. CAIN:

THE WITNESS: First, there are a number of multiple issues here. First, I think there is a premise, if I recollect the first part, that there are no controls over water. That I don't understand, because there are controls over water. No mention was made at what scale, at the State, at the County, at the municipality level.

I would say that there are over, for instance, for any diversion you must get permission of the State. So essentially there are controls over water, as I answer that part of the question.

With regard to the second part, the headwaters area, there wasn't exactly a question, but you did raise that particular point that Clinton is a headwaters area about midway within the South Branch.

That is a very crucial thing that could go back again to the nature of the performance specifications, that development can proceed within an area if there are performance specifications which will insure, to a very large degree, that there will be no degradation.

So I think that the fact that it is in a headwaters area does not mean that it is definitely constrained to be over developed. That I think would be certainly unreasonable.

The issue of what a municipality can do to control and regulate the use of water, the power to grant water diversions rests with the State. Presumably this would be the same thing with all of the States of the Union.

What" can the community do and what the Township has done is adopted the various storm water regulations, storm water management regulations, which specify that particular subdivision of a reservoir or commercial nature, has to meet

certain requirements. Therefore, that certainly canj be done and has been done in Clinton Township and other communities.

Did I miss a question?

Q No, I don't think so. The point about water supply and the point which you were making before about Mr.Reilly's idea as one of the bases for zoning as a water budget for the municipality, I think the point there that you said at that time that there were no regulations allowing this or justifying, that is what I meant by "no regulations."

THE COURT: . What is the question?

MR, CAIN: That was the point on that.

THE COURT: If you are making a point -- are you testifying or asking a question? What is the question?

Q The question is, that if you point to these charts and you say there are 4.6 million gallons a day here, available, and you look at the proposed water use of the 10,500 person development, and then you say it is a very small percentage of the demand on the region, it appears then, does it not, that there is very little effect on the water supply? A I read several questions in that question. One is, I think I would have to disagree with one premise or assumption that is being

made here. That is only looking at the extremely low ground water yield estimate in the 4.6 estimate.

Q Assuming the question that you look at that, because that is more than we need at the moment for this development? A No, I can't accept that, because you have other reserves that are available, that as a water resource management person I could not accept.

There are surface water resources that are also in existence that are, as of now, definitely proscribed to be shipped either within the basin, to the lower parts, or to the Passaic-Hackensack basin.

I don't see why a proposed development, you mentioned Madison, for example, or any other area within the lower basin, should have any more rights to the water within the basin than any other part of the basin. They have no special privilege, you know, to the water that would be generated.

So, therefore, I look at this, again, in terms of a variety of sources in which the ground water resources for the Township; is one component. There is more than enough within that one component, but still for planning purposes I would like to look at the availability of other sources of water within the region. That is why I go back again to mention both surface and ground water.

Q I suppose the real question then is about urbanizing watershed, is that not a very serious problem?

A Okay. In the urbanization, yes and no. In the absence of controls, yes, it would be a serious problem. We do have instances, documented throughout the U. S. where that would be.

In the presence of controls, it need not be. Indeed, the urbanization, one could argue, is actually runoff generating, that is, you are increasing the yield. The water is not lost to the basin because you have intakes and reservoir structures that are downstream of the proposed site.

So actually you could almost argue that you are increasing the expected yield, because that much less will evapotranspire.

The urbanization has both a qualitative and quantitative dimension. Quantitatively, you are increasing the yield. You already have intakes which allow you to capture a part of it.

* The State will presumably have the confluence reservoir at some time which will enable you to capture another part.

There is also a major intake facility at Bound Brook where Elizabethtown has an infiltration plant, where part of that can be captured and used for part of

the potable water.

Qualitatively, if you have specifications which will insure that there will be a very, very small amount, or that will insure that there will be a very small amount of impact, this would satisfy that component.

So you could answer that on both a quantitative and qualitative ground, with reference to your question of urbanization in the headwaters.

Q The answer then is just that local controls such as your storm water management and other local controls within the power of the municipality, then what is the real purpose of this overall water allocation plan that you are working on at the State level? If we can save the water supply by our own local regulations, then why do we need this water plant?

A Oh, the water plant has many components. It has, as I mentioned, a reconsideration of the safe yield, as a reservoir, which is an item of some concern. It has to look at the pricing. Is the State charging enough dollars for the raw water it generates? It looks at the public versus private as a mechanism for distributing water. It looks at the institutional arrangements. It looks at the Hudson River and it looks at the Delaware. It looks at many, many factors within that particular study.

Indeed, were that study not under way, it would not diminish in any way the comments that I am making. The information that would be derived from that is not necessary in order for me to arrive at any conclusions that I have now.

Q Would you agree that a 208 study should be completed prior to approval of a development such as a PUD of this magnitude?

MR. STERNS: Could you define 208 study?

MR. CAIN: Perhaps we can ask Professor Hordon to tell you, counsel.

THE WITNESS: The 208 study, Section 208, P.L.92-500 of the Water Quality Act of 1972, pertains to area-wide water management and waste water management. It is an extremely important component, probably the most important component, of P.L.92-500. So it is a major section of the Water Quality Act.

Given the items that I have seen, being involved with T.A.C., or the Technical Advisory Council gf Middlesex County, for 208, sitting on their sessions which are held once a month and open to the public, seeing the progress, the lack thereof that is being reported by that group and that is, of course, already advanced, I would

say that I would not want to wait until the 208 study has been completed. That is, it would be a rather substantial amount of time. The questions that are being addressed by the 208 study are extremely important and very complex, without any question. But I do not see holding off anothe£ five years, if that is what I get from your gist of waiting until the 208 study. It would be like waiting until the comprehensive water supply plan for New Jersey is finished. Already they are several months behind schedule, legitimately.

So the difficulty of getting five consulting firms together with other outside consultants, I don't think it is necessary to wait three years, five years, for the 208 study.

Q Hasn't that, though, been one of our big problems with pollution and over-urbanization, too much population, deterioration of water supplies and so forth, hasn't part of the problem been not waiting around for the answers? A Waiting, no, I have to disagree with you on that. Yes, they should go on, in part of it, yes. The studies are important and do raise a number of very important questions. But it would seem that one item that is already on the books that could be done, getting back to the municipality level,

are various ordinances, governing the management of water on particular subdivisions, which has been constituted by the Township and has been done. This would be a very effective control mechanism. I would hope that it would stretch throughout the State, for example, by other municipalities.

Q The suit of which you are a part is attacking these various ordinances as being excess and being exclusionary? A Wait, no, no.

MR. STERNS: He is talking about storm water management.

THE COURT: Just a minute, gentlemen. Let's not have colloquy. Make your objections, no colloquy.

MR. STERNS: I object, because 1 believe that counsel, quite properly perhaps, did not understand what the witness was referring to by ordinances.

1 would like him to explain, so that counsel can-be elucidated, or whatever the proper word is.

THE COURT: It seems to refer to another suit. VJe are talking about this suit which he is part of only as a witness. If that is what you are driving at, that is one form. Number two, as far as 1 know, he is advocating different types of

ordinances with regard to water management that is presently the subject of the zoning ordinance. Most zoning ordinances don't have anything about water management per se.

MR. STERNS: Your Honor, further, the proposall of R.V.I., as testified to and is in the record, complies with the storm water management ordinance of the municipality.

That is why I think it was certainly a misapprehension on counsel's part, I am sure inadvertent, as to what the witness said.

THE COURT: It went off in several different directions and it should be cured.

MR. CAIN: I take it, counsel, that the suit is not considering any of our soil sedimentation, erosion ordinances, or our water storm management ordinance as being exclusionary?

MR. STERNS: The Clinton ordinance will speak for itself. We are talking about storm water management, and storm water management, to my understanding, will comply completely with the ordinances of the Township. I think the witness should testify rather than myself.

THE WITNESS: Very specifically..

MR. CAIN: I thought Mr. Hordon and I agreed

that municipalities in fact, I thought that was your testimony, that by regulatory ordinances, that is the only way we have right now?

THE COURT: It is a very effective tool.

MR. CAEN: Yes.

THE WITNESS: I would like to clarify. The ordinance that I am referring to is ordinance number 90-76, called Surface Water Runoff Ordinance in the Township of Clinton. There are a number of clauses in that, that I am very much professionally in favor of. They specifically state, for example, enhance the quality of non-point: runoff by water retention measures. Article 1, Part IV, in article Roman numeral IV, they speak about maximum use shall be made of a variety of pipes as well as any proposed retention structures.

It is in the ordinance and I am suggesting that these, I think, are very sound management practices, which I would hope to have extended to other municipalities. That was the only context in which X was referring to the surface water runoff.

MR. STERNS: Let me clarify, if any clarification is necessary.

We have not objected to, nor is it subject

to suit by this plaintiff, as has been testified, and it tends to comply with it completely.

THE COURT: I don't recall Rahenkamp testifying to that, but the transcript is available.

MR. CAIN: I don't recall right at the moment, Your Honor. I thought they were taking the position that our regulatory ordinances there were in some way exclusionary.

THE COURT: Rahenkamp. testified, from what I gather, that storm water management is not defensible, and his expert agreed.

CROSS-EXAMINATION CONTINUED BY MR. CAIN:

Q Professor Hordon, I take it then, with respect to the surface water management ordinance, in your opinion then the development can be handled within the constraints of that ordinance and meet the standards of that ordinance as proposed by the development?

A Yes.

Q It can accommodate the three, 500 units, and 10,000 people, more or less, on the site?

A Yes.

Q If we carry that then further, if a municipality looks at more than one site and we take another 790 acre tract in the Township, making the same assumption again, I presume you would come up to the same

conclusion? A With regard to complying with the performance specifications, yes.

Q Yes. If we do this several times, so we are no longer talking about 10,000 people, but 20,000, and then 30,000, is it — excuse me, counsel.

THE COURT: Let him finish the question.

Q Does this have a multiplying effect still within the regulatory powers of a particular ordinance, like a storm water management ordinance, you could still get too much population?.

MR. STERNS: Your Honor, I object to the question on a number of grounds. Most importantly, the question implies that this municipality, or this defendant, has the right to pick and choose among who will be the next 10,000 residents. In other words, they are saying, well, if we give you 10,000, maybe we have to make it 20,000, 30,000, or 100,000.

We are dealing with one proposal, which proposal will probably increase the population over ten years by over 10,000 people.

If I understand counsel's question, can we, therefore, get it to 20,000, 30,000 or 40,000, can we, therefore, I assume that you can answer the question as to water viability for 40,000

people?

My point is that it is almost saying that the municipality can pick and choose who it is going to give it to. What you are talking about is that this increment represented by the plaintiff's case, we are not talking about the entire future.

The implication of the question is that somehow they can arrange for the future and then decide whether they are going to do this, and they can't.

If they have the availability of water, I think the law and Constitution is clear that they have got to give it on a first come, first come basis. At some point they may reach a limit with 10,000, 20,000, 30,000, 40,000, but that is not in this case.

THE COURT: What you are saying, Mr. Sterns, is that a community can't plan, it can't look down the line. I don't think any of these cases so far say that they can't plan. What he says is that he can exclude, that is a violation of equal protection. It is a wedding of your concept and Mr. Cain's in a sense.

Equal protection will demand that they

handle things on a first come, first served basis. What he is asking is,'how does a municipality plan, if you go on an arithmetical factor, geometrical progression?

Don't you reach a saturation point? I don't find that objectionable.

Do you follow that at all? I am sure you can, you are way ahead of us anyhow?

THE WITNESS: You can answer that in a number of ways. Again, I look at it in a variety of scales. One could — since you are raising that hypothetical assumption of a series of 790 acre tracts coming up, I guess one could say all the allocated 70 m.g.d. could be furnished to Clinton Township. That will support 700,000 people in one enormous series of high rises.

Again, this is a physical possibility that is there, but that would be a hypothetical.

As far as allocating then, it seems to me that that is the number.

Q What I was getting to was the accumulative effect. We seem to have cases where particular application is being justified on the basis that its impact is very small? A Well, that, again, would have to be answered in terms of the particular

areSL or portion of the State.

Were this particular 790 acre tract, let's say, would go in an area, I will take the instance which is subject to change, like the Hackensack basin or another portion of northern New Jersey, where that additional demand, these systems are already in a deficit situation. They are mining, they are pumping out more than the reservoirs have. That would have to be answered in a different fashion then.

When you are talking about an area like this, which is one of the few in the State that is in a positions, of a water surplus, water export", then my answer would be somewhat different.

Yes, there is a certain limit, you couldn't put ten million people in Clinton Township, obviously, there would not be enough.

Q That wasn't quite the magnitude I had in mind. But based upon what you said before, it seems to me that you could go from this 10,000 to another 10,000, to another, and assume, and assume in each case, justify for it. Could you not, in each case, justify the impact of that particular development, but yet wind up with a cumulative detrimental effect?

MR. STERNS: Your Honor, I would object to that question. The question starts with, it

seems to me, as being argumentative on its face. The witness has testified, as I understood it, 700,000 people could be put in Clinton Township. If you just talk of the water supply diverted to Clinton Township.

THE WITNESS: If you took only the unallocated reserve.

MR. STERNS: I don't understand it. If you want to say something seems to you, I don't object, but that is testimony and not questions.

THE COURT: Many of the questions are phrased that way. They are preceded by a long statement and then it becomes a very short question. It is a technique of asking a question which I recognize is somewhat used. It is not the purest method of trying to elicit the information.

If you are trying to supply the information by hypothetical, do it that x*ay. You are sort of mixing it that way. It doesn't bother me, it doesn't even bother the witness so far, but you are mixing it up. If you want to ask, can it reach a point of saturation, the answer is based on 700,000 people.

THE WITNESS: One could even extend that hypothetical again. If you are to go for an

additional, if they were to raise Round Valley again, hypothetically, you would get another 25 m.g.d. which would support another approximately 250,000. You can go on in that fashion.

Q Isn't one of the purposes of the plan to make allocation for the distribution of the water supply? A The plan, referring to the State-wide comprehensive plan?

Q Yes. A To make the allocation to the individual purveyors, because if that is the question, that isn't clear.

Q Are they going to make some kind of designation as to an allocation for a region, municipality, a county? A No, let's back off a moment. Because the State, in that case, one of the purposes of the investigation is to determine the magniturde of the water that is available within the State and inter-basin transfers. This is an internal allocation procedure within the State. They do not intend to say, let's say, Monmouth County, can only have so many

I think they might indicate that Monmouth County has X gallons of ground water and X gallons of surface water. That would be certainly a useful number to arrive at. But the internal allocation, this is an ongoing, dynamic decision process that the laws of the State alloiv

within D.E.P.

Q As to the origins then, the water supply, are are they going to make any such allocation or direction?

A Make an allocation? Again an allocation to an individual water purveyor or an allocation to a county, or an allocation to a region?

Q With respect to our area which I would consider, would you not consider the highlands or the origins of the basin water supply, is this water plan going to give us, going to shed any light on how much water we can use up here, how much we can urbanize the origins of the water, or how much has to be sent down stream, in other words, as a planning tool? A One is a quantitative assessment. What the water plan would hope to do is to give us some more reliable numbers as to what one would expect would be the yield.

Now, that is a hydrologic determination and that is not an allocation decision.

Manville can only have X gallons. The water plan would, of course, be addressing every other community, not, of course, just Manville, but how much is available within the basin and how much would be available by a variety of techniques. These are very useful questions.

Q Will it then address itself also to existing needs in various sections of the basin?

A Yes, it will.

Q Will it address itself to future needs within the various sections of the basin? A Given the uncertainties projecting population and water demand, yes, it would look at that.

Q Perhaps I used the wrong word when I said allocation. As far as in Clinton Township you can have so much water, that is not what I have in mind. What I have in mind was, is it going to give us a basis for planning so we know how much of the water is going to perhaps be needed elsewhere? A Yes, but the allocation is a specific right that a water purveyor, a water purveyor, when I use the term is either a municipality, the municipal utilities authority, or a private company. They are an entity and there are 500 other water purveyors in the State. They are allocated so much water.

The term "allocation" is a specific right that the State grants them to then distribute internally to their consuming population.

Suppose the population were to grow enormously, say in the Camden area in twenty years. Then the State would reallocate water from the central part and this is part of the allocation. The reallocation of the north Jersey district, for example, came up for renewal. It is an allocation based on twenty five years, since the time it was pumping

water from the Ramapo at 25 m.g.d., from the Ramapo River into the Wanaque Reservoir. Then the State has to have conditions, they have to say, have the conditions changed in New Jersey such that the initial decision to let them have 25 m.g.d. is reasonable.

So it is dynamic, it keeps changing. The allocation procedure then is obviously subject to population change, industrial use change and a variety of other factors.

Q Will the State-wide plan direct itself to protection of the origins of water supply, what should be done? A One of the components of the State-wide water plan, very definitely, will look at the water quality.

Obviously, water quality can act to diminish the water quantity by making it less and less available for use.

It may require greater treatment, it may require greater pollution, may be one component.

There are eleven tasks in that water supply plan and subdivisions of the tasks.

Therefore, water quality would certainly be looked at.

Q They could, in fact, designate the headwaters in our basin as critical? A I have to ask for a definition of "critical".

For example, critical I would interpret as a flood plain or floodway, that would be a critical area. There is specific State legislation regarding land use within the floodway and headwaters region.

You are referring to hundreds of square miles. You used the term "critical" and I am just suggesting that perhaps we want to be specific as to what the term would mean.

The floodway has a very specific — thou shalt not build within the floodway, if it is delineated. Certain structures, though, shall not do anything within the flood fringe, which is next to the floodway.

These are, of course, long, linear paths along the streams, and encompass about 6,000 miles within the State.

When you get to the critical headwaters, one might say that that is the entire upland portion of the Raritan basin.

For example, the entire upland area, for example,of the Raritan basin, which would include roughly this part over here, the entire Raritan basin is 1,100 square miles. The upland part of the basin is approximately 779 square miles above Bound Brook. That would mean that almost 807_Q of the Raritan basin then could be determined to be critical, because it is above the Elizabethtown water intake. Certajjily, you couldn't use the same term "critical"

to 800 square miies as you could to the long patch along the stream, like a floodway.

I am just suggesting that the term "critical[11] perhaps I am interpreting to mean in a different fashion.

THE COURT: It is now one forty, gentlemen. The criminal list doesn't look too bad this afternoon. Are you available at two thirty, maybe I can get you back at two thirty, quarter of three?

MR. STERNS: I am due back in Federal Court at two o'clock, but if I can call the office and find somebody, maybe?

THE COURT: Perhaps you can let Mr. Herbert carry on.

MR. CAIN: I anticipated that we weren't going to be here this afternoon, and I arranged quite a few things for this afternoon.

THE COURT: I would like to finish. Possibly, I would like to be over with this witness today?

MR. SUTTQN: I also have arranged a number of things. It is quite important that I be at my office this afternoon. I think possibly we can try to speed up matters next week.

THE COURT: Make other arrangements, gentlemen, it has dragged too long, too slow this morning. We have got to reallocate your time, gentlemen,

and we will meet at two thirty.

(Whereupon, other matters are heard before the Court, a luncheon recess is taken and the matter proceeds.)

CROSS-EXAMINATION CONTINUED BY MR. CAIN:

THE COURT: Everybody is here. Just ask him the question and get your answer, we are asking hypothetical questions.

MR. CAIN: I have no objection to that.

Q Professor Hordon, going to P-31 for identification, at depositions, I don't remember what number that was?

MR. STERNS: 102, you are talking about the March report?

MR. CAIN: March 11, 1977 report entitled "Environmental Assessment of the Water Related Impacts of the Beaver Brook PUD," P-102.

THE COURT: What about 102?

Q Going to page 6, Professor Hordon, paragraph three, under Putrefaction, "Excessive production of algae and other forms of plant life"? A Right.

Q "For example, the putrefaction problem in the Spruce Run Reservoir during the summer of 1976 was partly attributed to runoff from agricultural areas along the Mulhockaway Creek." Is that correct?

A Yes.

Q And you said '''partly". Was there another source or contributor to that eutrification?

A The term "partly" had to be put in, because the perticular climatic conditions during the summer — in other words, the runoff that would have occurred during the winter, it is a different kind of climatic condition during the winter. The term "partly" was meant that the fact that the other contributor was in the sense that it was the dry, hot conditions during the summer of '76.

Q Were you aware that there were problems with septic overflows in the Hampton and Glen Gardner areas during that same period? A • The particular comment with regard to the eutrification problem in the summer of '76 was based on an interview with the Chief of the Bureau of Water Facilities operations at Spruce Run, Therefore, the statement about the liilhockaway Creek was based on what he perceived to be one of the partial contributors.

Q Well, the other stream which feeds Spruce Run Reservoir is Spruce Run itself,is it not?

A Yes.

Q The septic system overflow from Glen Gardner and Hampton, getting into Spruce Run and going in the reservoir, would that contribute to the eutrification?

A Certainly.

Q ; The point I am making is that it is not the intention of page 6, paragraph 3, to blame that eutrificaticjn on agriculture, was it? A No, in the sense that it was a partial contributor. But if I can just clarify, it was a major component of the problem to Spruce Run, the fact that there was agriculture along the Mulhockaway. Obviously, there is fertilizer being used on the farms. The fact is that it was considered to be a larger contributor than Spruce Run watershed, so the Mulhockaway was felt to be delivering more nutrients than the Spruce Run.

Another part was, of course* the summer conditions of '76.

Q Paragraph 4 on the same page, we discussed sediment and you say, "In this context, it is worth while to mention that on a national basis the bulk of the sediment load being brought into receiving waters is caused by agricultural activities.[1].[1]

Now, in our area, is that a fair statement or would you have to include the sedimentation from development?

A Two different time scales. In a development, yes, there could be, in a development. If you don't have any erosion control mechanisms, such as a sediment detention facility, which now, under the Soil Erosion Control Act

for disturbance greater than 5,000 square feet, the State 4oes require some sort of erosion and sedimentation plan to be approved by the appropriate Soil Conservation District.

Therefore, the construction activities or development activities can yield -- can be attributed to sediment.

Q When you are speaking on a national basis, wouldn't the statistics supporting that cover a lot more territory being devoted to cropping, agriculture, such as the Great Corn Belt out in the midwest, to compare it say to our area where we have a good bit of development as well as agriculture? A The maps that went along with the particular report wherein that information was developed, indicate the western, the central or west-central portion of New Jersey to have, on the basis of its agriculture, an essential amount of sedimentation. This is particularly caused by the nature of the rocks and soils within that part of the State,

It would be greater, for example, in the west-central portion than in southern New Jersey. That would be caused by slopes, topography factors like this.

Therefore, in my opinion, one could draw from the national studies.

Q Now, is Mount Olive Township in our basin?

A Mount Olive Township would be in the extreme

headwaters portion, around the Budd Lake, the very beginning parts of the South Branch.

Q Was not there a considerable sedimentation problem up there caused by the developments in that area?

A I am not specifically aware of a Mount Olive sedimentation problem.

MR. STERNS: Your Honor, at this point, I would interpose an objection in the sense that if we are producing information which may or may not be correct, but which was not testified to, which was not a part of the report.

THE COURT: Is that groundwork question, are you going to produce someone that is going to discuss that?

MR. CAIN: I was asking him if he was aware of sedimentation problems as a result of those large developments up in Mount Olive Township.

MR. STERNS: Now, you stated there is a problem and there is no evidence or testimony that there was.

THE COURT: He can be setting it up for future, direct testimony. If he represents to me he is going to produce someone that says that there has been sedimentation above the headwaters, stating that the problem is not just agricultural.

You are going to produce somebody to testify to, that. Is that right?

MR. CAIN: I believe that would be covered in our testimony, yes.

THE COURT: It is a groundwork question and perfectly proper, let's go.

Q On page 6-B, which is near the bottom of the Page, I take it from that then that you state and it is your opinion that non-point sources of pollution may equal and in some cases exceed point sources?

A Yes, and in some of the studies that have become available, the non-point can equal and exceed point sources.

Q Is that easier or more difficult to control than point source pollution? A Non-point could be more difficult to control than point.

Q At the bottom of page 7, Water Quality in the South Branch, you indicated that in ten sampling sites that the standards are not being met for pH and fecal coliforms. What did you mean by that?

A The statement seems self-explanatory. Out of the ten sampling sites which the State has maintained during the early 1970's on the South Branch, and the parameters being mentioned, the DO, suspended solids and total ammonia as nitrogen, are being met. pH and fecal coliforms were exceeding the standards as compared to the DO and suspended

solids, the total.ammonia.

Q Are we talking, Professor, about the point or non-point source pollution? A It could be both, because you are talking about ten points on the South Branch, which is over 50 miles in length. We have the sampling sites that are located at irregular distances along the stream. You have a variety of point and non-point contributors.

Q Could then septic system troubles in areas along Spruce Run, along the streams overflowing and so forth, contribute to the fecal coliforms and ammonia? A Yes.

Q Is there any way of knowing whether the fecal coliforms are animal or human waste, just based on the sampling? A What would be useful is to get the fecal and streptococcus, what is referred to as fecal streptococcus, then make your comparison between the fecal coliforms, which was not available.

Q Which was not done? A It was not done. Since it wasn't done the ratio was unavailable. Therefore, one could not make that comment on fecal strep.

Q Page 8,^paragraph 3, the second paragraph in three, you state that "thus, all developments upstream of the Hamden intake site may have an impact on water quality in the reservoir." Is that correct?

A Yes.

Q Does that mean then that care must be taken in planning, the site planning and the construction of these developments? A Yes.

Q Page 8, paragraph 5, about the middle of the paragraph. You indicate, "Other research indicates that non-point source pollution account for more than half of the organic pollutant loading coming into a stream. Thus, point sources, as exemplified by a sewerage treatment plant, should not be singled out as the sole major contributor to effluent loadings in a stream."

A The point and non-point source is important. The reason why I am convinced that ordinance 90,76, which calls for among other things the possibility of water retention, that these are sediment traps, and this is an excellent non-point source control mechanism or control device.

Q On the same page, toward the bottom, paragraph 6, you refer to a 303(e) basin plan?

A Yes.

Q Based upon the draft, you indicate that the Raritan basin plan raises the possibility that all sewerage treatment plants in the upper Raritan will have to go to advanced waste treatment, which means nutrient removal, whenever the confluence reservoir is completed.

Does that mean that even more care will have to be

taken for development in that same area?

A What that means is what it says. That the fact is that there is a possibility that advanced waste treatment may be called for, which means an addition to existing plants, which is physically and hydrologically possible. It means additional in-plant equipment, etcetera, which can be added onto and incorporated within the plant, and the possibility escists.

Q Is this directed to quality of the receiving stream? A It is directed to the --no, if it weren't for the confluence reservoir being downstream, the advanced waste treatment may be postponed substantially into the future. But given the confluence reservoir, then you will have an impoundment. Therefore, the water quality will, in order to avoid any eutrification, particularly to the nutrients and nitrates, phosphates, you are going from a free flowing river into one that is an impoundment. Therefore, there is a possibility that you would want to go to advanced waste treatment.

Q As a jnatter of fact, above the Hamden intake we have almost the same situation, don't we, in that that is where the pumping station is, that lifts into Round Valley, which is an impoundment? A Yes.

Q That would also mean, would it not, that

the quality of the stream above the Hamden intake must be kept high? A The timing is different because the Hamden intake, the pumping is predicated on the reservoir operation, reservoir levels. The confluence reservoir, being downstream, has to receive whatever is coming down the river. The Hamden intake, for example, the operating schedule could vary depending upon the water demand and release requirements. So there is a difference between the two systems.

Also, the Round Valley is a different kind of a reservoir, much deeper and colder. It tends to be what you would call allicatrophic. It is a different water body than that, and its utilization would tend to be less, given its depth.

Q But you did testify that the watershed which contributes to the Round Valley reservoir, being approximately 140 square miles, is not sufficient to provide water for the reservoir. Does it not depend on pumping out of the South Branch?

A May I go to — I'm sorry, what is the point?

Q Maybe the question isn't clear. I have in my notes that you said that 5.7 square miles was inadequate to supply the Round Valley Reservoir?

A That's correct.

Q And, therefore, does it not depend upon

pumping out of the South Branch? A No, the 5.7 square miles is the contributing area to Round Valley Reservoir. This would be totally inadequate to furnish the water. There wouldn't be enough gallonage developed from that site. Therefore, you have to go from an intake, which is Hamden, from the South Branch, to pump.

The Wanaque is also oversized for the drainage area of the Wanaque River. Therefore, it requires pumpage from the Ramapo and Hamden intake, about 140 square miles of the South Branch.

So, therefore, the 5.7 square miles is just the area that would be shown in essentially the purple on the map.

Q The 147 square miles up above the Hamden intake, though, is the watershed for the stream as a whole? A Yes.

Q Above that point. Is that correct?

A That's right. Round Valley depends on 40 odd square miles.

THE COURT: In other words, the reservoir site doesn't generate enough in and of itself?

THE WITNESS: It would be hopeless.

Q Does any reservoir? A Yes, there are reservoirs. Spruce Run is what they refer to as a run-of-river reservoir. Whatever comes down the

Mulhockaway and Spruce Run, fills up Spruce Run Reservoir. There is no pumpage from the South Branch into that reservoir. The Boonton Reservoir of Jersey City, on the Rockaway, would be a run-of-the-river reservoir. The Wanaque series.

Q With respect to the confluence reservoir, which I take from your testimony was a reservoir to be built in Somerset County where the North Branch and South Branch meet? A That would be downstream of that. It would be approximately where the North and South Branch confluence. Therefore, it is called that. Here is the North Branch, and it would be at this point, approximately.

(Whereupon, the witness indicates.)

THE COURT: Now, pointing to Exhibit what?

THE WITNESS: This is Exhibit P-105.

Q Pointing to the confluence of those branches of the river where the North Branch and South Branch merge, of course, to form the Raritan in Somerset County?

A Yes.

Q That becomes an impoundment, as you testified, reservoir? A Yes.

Q Did you also testify that was planned to pump some of that water back up to Round Valley Reservoir?

A Yes. This would increase the yield of the Round

Valley.

What you would be doing now, instead of just getting intake at Hamden, capturing 140 square miles, you would be capturing the yield from the North Branch and the entire South Branch. So you are talking of the order of 450 square miles.

Q In effect then, aren't you going further downstream and pumping water back up to Round Valley?

A Yes.

Q In doing that then, I take it from your report, that it means that you have got to be a lot more careful with the river than when the confluence reservoir comes in? I take it that you have now got to more ;careful with the river between Hamden and the confluence reservoir?

A Yes.

Q How many standard treatment plants are there between Clinton and the confluence reservoir?

A Clinton, P-14, includes municipal and industrial. There are about seven odd plants, they are small plants. There are no major facilities.

Q Would you say it is a minor or major expense to convert SIP from a secondary, or the present treatment to advanced treatment?

A It depends on the percentage of removal. As you go beyond 95 to 97, 98%, it becomes increasingly expensive to go for that

removal of the last couple of percent. To go for nutrient removal would be considered a moderate expense.

Q That is what you have in mind, though, if once they build the confluence reservoir, then the treatment plants along the river are going to have to go to the advanced stages of treatment and nutrient removal?

A They may have to go to nutrient removal, which means that the advanced treatment, AWT, means nutrient removal. In these cases, this may have to be dependent on existing, secondary plants along the river,

Q Would that raise the cost of .sewer treatment to the user of the plant? A Yes.

Q Do you have any quantitative figures as to how much, or is that somebody else's expertise?

A 1 believe the Taylor, Weissman and Taylor group would get into that perhaps.

Q Does this mean also, then, that you are going to have to be more careful at the non-point source pollution along the stream, down to the confluence reservoir?

A Well, since non-point may account for half of all of the'loading, that would have to be taken into consider-ation, yes.

Q Now, page 9, you talk about storm, and 1 don't want to spend much time on that. But you use a simplified storm model. 1 am not sure that even drawing

on my own background in mathematics, that I can handle that without a computer, but is that simplified storm model sufficiently tested to be accurate for these determinations?

A Sufficiently tested, since the report involving the model is dated October, '76. That would be less than — it is the most recent EPA.

Q Does EPA approve the simplified storm model?

A By publication of the document by EPA, it would imply that there is a distribution. It had to be approved by EPA in order for them to distribute it through their channels.

Q Now, when you did your estimates, using that model, the percent of impervious cover which you used, the 20.6%, was that taken from the Rahenkamp plan?

A The impervious cover for the PUD; correct?

Q Yes, the PUD. A Yes, that was taken. The number of dwelling units for each, for the Goble site, was determined from the Rahenkamp report.

Q Then you relied upon that plan as to what Rahenkamp said was going to be the impervious cover as compared to what would not be impervious then?

A No, or partly no, because in table 2 on page 10, some of the acreage estimates in the table 2, marked percent impervious, have "no, note D". Note D suggests States should take the average value based on EPA studies.

Therefore, for every calculation, some was based on Rahenkamp and some was based on EPA. That is for the different types of land use categories. Each type specified of table 2 was to be used as to the source used and the footnote D applied to a community's facilities, commercial and open space.

Q Does that 20% include all the roads in the development? A Yes, because the dedicated right-of-way in the ROM in table 2, page 10, includes 48.2 or approximately 10% of the total tract.

.... Q All of the parking areas?

A No, the parking areas would be included within each land use category. The dedicated right-of-way would not be. The individual driveways for the homes, that would be the arterial streets, which would fall under the dedicated right-of-way.

Q Then the three, 500 units, and all of their associated impervious improvements, would fall onto the 20.6% of the PUD development? A Yes, because 40% of the tract has been left open space. .

Now, the individual garden apartment would have a higher percent impervious. But of the overall tract, that portion of the tract covered by townhouses and garden apartments, would come out to be less than the 33 or 34%.

Q If 40% is open space, that leaves 60% then.

You are saying now, of that 60%, only twenty of it is impervious? A Of the Goble estate or the Goble tract, using the impervious cover and using the Rahenkamp land use categories. I estimate that 20% -- this was arrived at independently. But it comes out with one percent of what Eahenkamp estimates to be the impervious cover for the entire Goble side.

Q Then the 40% that isn't open space and isn't impervious, what is it, what is that, in this development, those little spaces between the houses?

A The lawn areas.

THE COURT: Anything else besides lawn areas?

THE WITNESS: Lawn areas, the stream channels, the areas around, along the streams would occupy a proportion of land, trees.

THE COURT: How about these detention basins?

THE WITNESS: That would fall within the open space. That would be, of course, impervious. It would not be covered within the impervious cover.

Q If you include open space area, I am going to use that in a larger sense, meaning everything that is not impervious areas that are in use as streams or detention basins. Isn't the absorption rate different there, would they not have a different coefficient for absorption, whatever you call it? A Between the

retention area and the lawn area?

Q Yes. A Yes, there would be a different infiltration rate depending upon different soils on the tract.

Q What I am getting at, I am wondering if the 20% impervious is a high enough figure to plug into the model, because you have other areas which either, because they are streams or because they are being used water in them, detention basins or other channels, they are close to being impervious, aren't they, at the time that they are being used? A Reading Rahenkamp's document, they tried to put the detention facilities, as much as possible, in the more permeable parts of the tract. Therefore, that would only aid the infiltration.

Q Maybe the point is too simple, if you have areas which are already under water, is it fair to include them in the portion of the formula which is not impervious? A Is a pond impervious?

Q Yes. A It would depend on the operation of the particular pond and how long water would be retained within the pond itself.

Obviously, if there is precipitation on the pond, which is at capacity, so to speak, additional water coming in to that would then have to go as surface flow.

Q What you are getting at, using the 20% figure, when you are comparing PUD with the 50% figure or something witii ROM, I wonder if the 20% figure was really a fair figure to use?

THE COURT: He said it is.

A Using the land use category as denoted by Rahenkamp, these are reasonable numbers.

THE COURT: 20% PUD, 50% ROM. Is that right, sir?

THE WITNESS: Given the land use categories given to me.

THE COURT: Okay, I got that.

Q On page 11, where you reach the conclusion, in the middle of the page, that ROM generates additional runoff because of the great amount of impervious cover, that the ROM plan was based upon a theoretical synergy, that you calculated? A No, the ROM — all I needed for the ROM was the percentage of impervious. Here, I started initially with 80%, because the EPA manual suggested 80% impervious cover for commercial.

This was revised downward, because Clinton Township has a regulation stipulating 20% building coverage within the ROM zone. An additional 30% was added onto that to cover parking, to cover parking lots, driveways, loading ramps, rights-of-way. That adds up to 20 plus 30,

50%.

Q VThat I am getting into is, you did not use a plan that Mr. Rahenkamp or somebody proposed as a feasible RCM development plan? You simply took the 20% cover, impervious cover limitation from the ordinance and the buildings, and you added on to it a figure of your own of 307o to come up with the 50% impervious cover? A In order to make a reasonable alternative or comparison between RCM and PUD, I had to presume, if PUD was going to go for complete development of the tract, that the RCM would also not be in that posture and, therefore, would be developed to the same acreage.

Q But there was no specific plan, no model, that these points differ, did they ever give you a plan or model? A No.

Q But some developer might propose an RCM development as opposed to just taking the parameters of the ordinance, mathematically, hypothetically?

A But would seem to be the most reasonable under the circumstances.

Q That assumes a complete development then of the entire Goble tract? A In order with the Township[f]s regulations regarding maximum building coverage, but this presumes that a company would not go

into an ROM and just develop one percent of its acreage.

THE COURT: We understand, let's go to the next point.

Q Now, you indicated that the imaginative drainage basins and other methods of storm water control, using those you could stay within the ordinance, the Storm Water Management Ordinance for the PUD. Is that correct? A With the performance specifications, yes.

Q I think you said that that is important, that all of these standards set up must be followed, that was one of the limitations of your approval. Is that correct? A That is correct.

Q Now, isn't it reasonable that you can accomplish the same results using the same techniques on ROM? In other words, can't you use retention basins and other storm water management techniques and still control the runoff in. an ROM development?

A Yes, you could, except the greater percentage of impervious cover would dictate, necessitate a much larger detention facility. If that was the mode of storm water, yes, it would be feasible.

Q Even assuming that, and recognizing that you would have in your theoretical model, 50% of the ROM tract to use for those facilities, could you not develop

a plan which would contribute no more runoff than the PUD? A In terms of quantity, by having larger retention basins, yes.

Q Now, you also indicated, I believe, page 13, the middle of the page, I believe you have a typo there, don't you, where you indicate, "Another conclusion worth nothing is the enormous benefit to be gained by increasing street sweeping frequency." That was a conclusion worth nothing? A That is a typo, it is worth noting.

Q You, of course, are saying that you are referring to frequencies over twenty days?

A That is an absolute typo of the first order.

Q Is there any reason to believe that under an RCM development you could not have effective, or perhaps more effective street sweeping and housekeeping than on a PUD? A The nature of the materials would vary considerably, depending upon what facility was within the R.OM. One could imagine chemicals, for example, being handled, transported, stored and loaded, unloaded, within an ROM, which could increase the hazards associated with that.

So it x^ould vary, depending on the categories, of commercial facilities, which might include industrial, within an ROM.

Q We want to be fair here. We don't want to assume the best for the PUD, Professor, and the worst for the ROM. Can't we assume the same kind of control and supervision regulations? A The same kind of controls, the same kind of street sweeping frequency. But the nature of the materials handled may be different. You won't have chemicals,presumably, just to give that example, being handled in a PUD as might occur in a commercial and industrial facility.

Q Well, the types of industry that appear to be locating out in the suburban areas don't tend to be the Cyanamids and Union Carbides, chemical plants, do they, they are more apt to be office research plants, lighter industry? A The nature, it will depend —

Q Did you make observations in the Clinton Township area of the types of industry which have settled out here? A Yes.

Q You observed, I take it, New York Life, A.M.Best? A Yes.

Q Do you know that, using New York Life or A. M. Best as an example, that you would have difficulty with the housekeeping of the area, in terms of chemicals? A In that case, obviously, the chemicals would not be an item in trade.

Q Then isn't it fair to say then that it depends on the industry that you get for the particular user?

A Very definitely.

THE COURT: It runs the whole spectrum.

MR. CAIN: Yes, sir, that's true.

THE COURT: Like research and office manufacturing, gunpowder, you can run the whole spectrum.

Q In terms of water availability in the area, is it likely that you would get a chemical or a wet industry in Clinton Township?

THE COURT: You can answer the question, unless you think it is too speculative.

MR. CAIN: If he can't answer the question —

THE COURT: All right, don't answer it, it is too speculative.

Q On page 14, the target appears to be agricultural runoff. Again, you are referring to sediment is the non-point solution source of the greatest significance. Is that correct? A Yes.

Q Wow, are you assuming good agricultural techniques with terracing, retention basins, and other practices which agriculture can use, or are you assuming that scmeone is just to go out and plow the fields in any direction and plant a lot of com, just let things happen? A The type of

practice will, of course vary, and will influence the rate of sediment production. Yes, that will have an effect on the amount that would be generated.

Q In terms of raw pollution from a tract such as the Goble tract, would you make a comparison between agriculture and PUD? A As I indicated yesterday, it is difficult to directly compare in terms of the model, the amounts of pollution that would be caused by either type of land use. But the PUD would have the retention basins as the very crucial part in the surface flow, the storm water flow.

Q Environmentally, wouldn't there be less impact from the tract on agriculture than as a planned unit development? A No, the agriculture would be a very substantial, or could be a very substantial -- I don't have the exact quantities, that would be forthcoming from the tract, but could be a very substantial contributor, given the nature of farming operations and the applications of fertilizer.

Q It wouldn't have 5,000 people, would it?

A No.

Q You can use land management techniques to prevent silting in agriculture as well as other development?

A There is a cost attached to that. Yes, it is possible to do.

Q You, of course, are not suggesting that we do away -with agriculture and put in HJD's, as environmentalist, are you? A No, naturally. It is just to demonstrate the fact that agriculture is a contributor to pollution, period.

Q Now, again, on page 14 at the bottom, you in fact indicate that urban areas apparently generate greater pollutant loading rates for total phosphorus, BOD and TSS, than agricultural areas. Is that correct?

A If you allow the next sentence to be included there.

Q You go on to say that, "The data, however, must be interpreted with caution, since many older core cities with abundant street litter, dog manure, etcetera, are included in the studies."

Are you saying that the dog manure and street litter make up the difference then, and that in your opinion agriculture does generate greater pollutant loading rates for phosphorus, BOD and TSS?

A Two types of studies would go- The older core cities, the housekeeping there tends to be, shall we say, substantially less than it could be. There is an accumulation of debris on the streets, and litter, which tends to make the organic pollutant loading very, very substantial, when you include the older core cities in the U. S.

Q How about the street sweeping, wouldr^t that do a lot? A ' Yes, that would help. Yes^ if you allow the page, or the paragraph to go on to page 15, a recent research report in 1975, and I will quote from that particular study.

Q Where are we? A Essentially, page 15, the first paragraph under table 6, which begins, "Agricultural, urban and wooded lands" where the results come from Central New Jersey.

Qae of the conclusions that is quoted from the study, which was conducted by Rutgers, that agricultural areas could contribute enormously.

Urban residential areas reflect very recent DOD water quality sampling in central New Jersey, during the early 1970's.

Page 16, under item VIII, has all the conclusions, Mr. Cain, in this pont. I think you covered all of them about now.

Q Now, page 16, Koman numeral VIII, your summary. The first paragraph, first sentence, it is a statement, I believe, of what I asked you before, as to whether or not there had been any environmental degradation which lies in the development site plan and commensurate water management features contained therein.

That is the limitation that you place upon your

conclusion that this PUD will not significantly, I think " you said, degrade the – A Wo, I stated on the last sentence in that first paragraph, that it will not degrade the water environment for the following reasons.

Q Then you state that it will not degrade the water environment at all. Is that correct?

A That's correct.

Q Page 16, paragraph II, seems to indicate that the Clinton plant is capable of handling the flow from the development.

Would you say in terms of hydrologic capacity, does that just mean the handling of the water itself, or was that related to the treatment of the effluent?

A In the hydrologic efficiency or the design capacity is 2.03. In that case, the delay in going from the 1.5, or the difference between the 1.5 m.g.d. and 2.3 m.g.d, has to do with the sludge disposal phase of the treatment plant. That has not been approved as of yet by the DEP.

Q Actually, you said in terms of hydrologic I capacity, the Clinton plant is capable of handling the expected flow of 0.7 m.g.d. from the PUD. I took that to mean that it is seven over and above the 1.5 m.?

A Ho. That is the unused capacity, were the plant to allocate that capacity to R.V.I., they can do that.

Q You stated somewhere, I can't put my finger on it at the moment, that the plant has a 1.5 million gallons per day design capacity and it is now only handling .6? A That's correct.

THE COURT: That is point 2 on page 16 of the report, part of the fourth line.

Q That is stating that the plant has the capacity then to handle the effluent anticipated from this PUD? A The plant has the capacity to handle 0.9 m.g.d. from whatever source and still be within its permit and still meet EPA and DEP requirements.

However, the expected flow would be less than the 0.9.

Q Now, as indicated in paragraph 3, the BOD and suspended solids removal rates were well in excess of 90%. I believe you compared that to the Passaic or some other river and indicated that this plant had excellent performance. Is that correct? A That's correct, but the item is a comparison with the Passaic's dilution ratios rather than the treatment capacity, treatment efficiency of 90% or greater.

Q Was dilution ratio related to BOD removal?

A Ho. You can have dilution ratio of 99 or 15%, dilution ratios that will vary. If any plant was, let's

say discharging into the Atlantic Ocean, the dilution ratio would be very, very substantial.

Q ! Now, the performance of the plant at the present time, which you said is in excess of 90% as to the removal of BOD, suspended solids, that is based upon its operating at the .6 capacity? A Yes.

Q Well, I guess 600,000 gallons?

A Yes.

Q Now, if you add in, assuming that you get approval from the authorities in Clinton Town to put your 800,000 or whatever your anticipated flow is, through that plant, are you going to add more BOD or suspended solids to the stream? A You will be adding more pounds of BOD and more pounds of suspended solids that will be coming in. But this *ill still be will assimilative, and the capacity of the South Branch of the Raritan is within that reach.

THE COURT: You are also putting more water in the stream, aren't you?

THE WITNESS: You are putting an additional 700,000 gallons into the stream.

THE COURT: There are more and more parts per million that can be dispersed?

THE WITNESS: Well, the percentage removal would remain at 90% or greater. Therefore, the

concentration would be about the same.

THE COURT: The number of pounds coming out would be so much greater because of the additional -- that is all silt, by the increased gallons?

THE WITNESS: That's right. I went through all of this with the High Bridge sewer case.

Q Is the additional gallonage sufficient to be taken into consideration with the additional suspended solids and BOD, to completely offset the additional loading of the stream? A There is a margin in here. The stream has been given the reach. To be more specific, the South Branch has been given a loading of 250 pounds per day. Which means that is a simulative capacity as determined now by DEP.

The additional amount coming in from R.V.I., obviously when treated, not raw, will be well within the 250 pounds per day allotment by the State.

Q Now is 250 pounds the minimum standard for the stream? A The 250 pounds refers to the reach.

Q BOD? A To the particular length of the South Branch at the point where treatment plant has its outfall. The poundage would vary according to different reaches. Because that is part of the hydrology, the depth, the flow and width, the other channel

configurations.

Q i But you would be increasing the BOD loading of the stream by the effluent from the subdivision?.

A Yes, you will be increasing that.

Q But you would still be within the 250?

A Within the 250 pounds.

Q How, I don't know, and 1 expect we will find out when we get to the successive witnesses, how much capacity has been spoken for in the plan? But assume they already have commitments for 1.5 m.g.d. There is an agreement, if I can use that term, there is an agreement or a statement that was prepared by Mayor Smith of the Town of Clinton, dated April, 1977, which discusses the allocation of capacity within the plant. Is that where you got your 600,000? A No, the 600,000 comes from the records of the EPA in New York City, entirely.

Q How much is really left?

MR. STERNS: Esccuse me, Your Honor, he asked him a question about the capacity.

MR. CAIN: I think he just repeated it.

THE CCURT: Give him a chance to conduct his record. He asked about allocation. I think we are almost finished, so let him answer.

There are only four or five parts of the

summary and he covered four of them, I think.

Q What did they say about Mayor Smith in April of 1977? A Here, what Mayor Smith is indicating, is that there is an unallocated reserve of 500,000 gallons per day as of April, 1977, and a calculation of 161,000 gallons available for immediate sale now, as of again, April, '77.

So that this would seem to indicate that at least 161,000 gallons would be certainly immediately available and part of the reserve could be applied to any use.

Q Actually, isn't it not true that to take the full 800,000 gallons, which the development proposes, that the plant would have to be increased over and above .5 million gallons a day? A That would depend upon the internal --or the allocation.

Q Who gets there first? A It would be an allocaten that decided upon by Clinton Town.

VThat would occur is that the decision would not have to be immediate, that is next month or next year, it would be decided as users come on line.

Q But what I am getting to, maybe it is a question for Mayor Smith, but is there 800,000 gallons available in the 1.5 m.g.d. plant? A There is available, again, from the values here, 661 gallons available by the plant.

Q Then, if you need 800,000,you are going to have to increase the size of the plant. Is that correct?

A Either that or reallocate.

Q Take some away from somebody else?

A Recalculate the reserve that has been set aside. For example, the Town of Clinton was allocated 322,000 gallons. That could be reallocated in the future.

We are talking about a sewerage need a decade plus. There could be certainly a reallocation within that decade.

Q Also, if the sludge is up to 2.5, you have got more room again, you have got another 500,000?

A That's correct. The sludge, as they stood in the sludge pits, if they were increased the DEP would allow them to go another half of a million gallons.

Q Sludge is not related to BOD, is it?

A No, but the -- well, the sludge which is now being disposed of on a 40 acre site, when that digestor, when the aerobic digestors are finished, would go to .3, which would then open another 500,000 gallons to users.

Q At that point we would still have the 250 pound BOD standard? A The 250 pound BOD is the simulative capacity, determined by DEP, which is a draft document as of now.

Q Then you don't know if the full use of the plant at 2.5 would exceed that? A Not 2.5, 2.03.

That would be within the 2.50 pounds.

Q Now, taking into consideration the plant itself, which you said had a high removal rate, it is actually performing higher than the State standards, isn't it? A 90% would be required. They are operating actually at 95, 967o, which is exemplary for secondary plant.

Q If you added 750,000 or 800,000 gallons of sewage from the PUD, would they still be able to hold the same percentage? A They will certainly be able to hold the 90%, which is what is required and the 250 pounds.

Whether they will hold the 96 or 97%, they may still be able to if the plant has the capacity. The key thing is that they will be over 90% and within their 250 pounds.

Q But they still might run afoul of the non-degradation policy. Is that correct?

A No.

Q Well, I believe you explained earlier that the policy was to hold the streams at their present quality, even if they are higher than the State standards. Is that correct? A Right. The non-degradation policy — here, okay, I am quoting from the draft document of the 303 basin plan. What this is

saying is essentially the anti-degradation policy requires that where existing water quality is superior to established minimum criteria existing, the quality will be maintained unless overriding social or economic factors dictate otherwise for any given water body.

However, existing conditions may change from day to day or moment to moment. Therefore, the guideline that would be used would be the poundage per day of BOD and suspended solids per stream reach.

Q But we are going to have some degradation by increasing the BOD, by putting the extra 800,000 gallons of sewage through the plant, are we not? *

A Not as long as you are within the simulative capacity, the poundage per day limit.

Q In your opinion, the simulative capacity, which appears to be based upon the standard minimum which the State has set, then what does the non-degradation policy then mean? I throught it meant that you would keep it at a higher quality if you are operating at a better percentage?

THE COURT: It is now four fifteen.

MR. SUTTON: I am going to have to examine him.

THE COURT: I thought this was joint cross-examination. Is there something else?

MR. SUTTON: Our agreement was that where

Mr. Cain took the depositions, he would question first, then I would follow him.

THE COURT: I don't think there is anything that Mr. Cain has not covered with regard to this expert. He is very thorough. He covered every rock in the Mulhockaway, the South Branch, North Branch, everything, the entire basin.

Then he just read to you what was the policy and so forth, the socio-economic constraints and restraints. Is that correct?

THE WITNESS: Correct.

Q Then are you saying that you have to take into consideration these factors, the social factors?

A Economic and social factors can be taken into consideration.

Q But chemically we are degrading the stream?

A There is going to be DO, though, the 250 pounds per day means a bottom of six parts per million DO. Which, for the FW-2, the stream maintenance classification, will assure a viability of aquatic life within the stream.

So we are keeping within the six parts. The 250 pounds means that six parts per million will be the minimum or the floor within that reach. That is the standard floor.

Q But the fact is that we are operating better

than that now? A That is dependent upon, again, it gets back to the ambient conditions.

The ambient conditions are seasonally arrived at on an average, the low or the high, dependent on what period of record you use for your samples.

Q Then you can't say whether or not you would run up against the State non-degradation policy?

A In that case, the six parts per million or 250 pounds per day would be in accord with State policy.

Q Then we might drop from 97% removal down to 90, is that correct? A And still be within the 250 pounds.

Q We would be within the State minimum standards. Is that correct? A Yes.

Q But we would have degraded the stream below what it is now? A In that context -- in other words, going from a DO of 7. or 7.0 down to 6.5, you would still be within the State standards.

Q We keep coming back to the minimum standards. But I was trying to say where we are now, that was the point? A Well, where we are now depends on what sample you would use in order to arrive at the ambient.

Q That part is a little bit illusive.

Going back to your testimony that the removal

rates are excellent and the performance is very good, they are up around 95 to 97%, whereas the State standards are around 90%? A Wait, no. The State requirements calls for a removal of 90% or better.

Q You had said that you can treat the additional effluent and we would still be within that standard?

A Yes.

(Whereupon, discussion takes place off the record.)

MR. STERNS: Your Honor, if I may suggest, for Tuesday, I don't know whether this will be a help or not, we have three experts, all of whom have been deposed and examined by counsel.

1 would propose in an effort to speed it along that the reports, all of which*1 know you have, I am talking about Mr. Pearson, the traffic study, Mr. Taylor, Mr. Salvatore Relli, having to do with waste water, and sewerage treatment, water supply. But 1 would propose, if it is acceptable to you, that 1 will not question directly any of those witnesses. But that if you could, over the weekend, go over them, I will put the r eport in for what it is and try to speed it up that way.

THE COURT: As we did in parts,with I think

his report and other reports, Akahasi and so forth. In other words, we would be able to have the people here to identify the reports and the qualifications are all given therein and you can go to cross?

MR. STERNS: They have all been examined in depositions.

THE COURT: I have read the reports. The only report I hadn't read was the one of Dr. Hordon. Would that procedure be acceptable to you?

MR. CAIN: I don't care if we examine them directly or not. We want to be able to examine.

THE COURT: In other words, the report is in lieu of direct?

MR. STERNS: What I am saying, is that I would just submit the report. Every word there is as testified to. I am asking if you could see if you have any objection to that, because it would save direct examination? .

THE COURT: It is in lieu of direct as a.' PUC hearing, as something else like that?

MR. SUTTON: I believe we can read the reporjt and if there is something we cannot agree to, we will let you know.

I think we can agree to the majority of the

report now.

THE COURT: Are we going to cross-examine this man on something else, 1 was hoping, that we wouldn't have to bring him back.

If you think there is something Mr. Cain has not covered in his very, very thorough examination, I would like to know what it is first.

MR. SUTTON: It was a very thorough examination, but there were a number of items that I would like to go into.

THE COURT: See you on Tuesday.

(Whereupon, the matter stands adjourned.)
