STATE WATER RESOURCES CONTROL BOARD

PUBLIC HEARING

THE LEGAL CLASSIFICATION OF GROUNDWATER APPROPRIATED UNDER WATER RIGHT PERMIT 14853 (APPLICATION 21883) OF NORTH GUALALA WATER COMPANY MENDOCINO COUNTY, CALIFORNIA

TUESDAY, JUNE 4, 2002

9:00 A.M.

CAL/EPA BUILDING

COASTAL HEARING ROOM

SACRAMENTO, CALIFORNIA

REPORTED BY: ESTHER F. SCHWARTZ
CSR 1564

CAPITOL REPORTERS (916) 923-5447

STATE WATER RESOURCES CONTROL BOARD:

ARTHUR G. BAGGETT, JR., CHAIR
PETE SILVA
GARY CARLTON

STAFF:

PAUL MURPHEY

COUNSEL:

BARBARA LEIDIGH

---oOo---

REPRESENTATIVES

NORTH GUALALA WATER COMPANY:

BARTKIEWICZ, KRONICK & SHANAHAN
1011 Twenty-Second Street
Sacramento, California 95816
BY: ALAN B. LILLY, ESQ.

DEPARTMENT OF FISH AND GAME:

HARLLEE BRANCH, ESQ.
1416 Ninth Street, 12th Floor
Sacramento, California 95814

NATIONAL MARINE FISHERIES SERVICE:

STACY K. LI
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

JEROME P. LUCEY:

JEROME P. LUCEY
66 Manderly Road
San Rafael, California 94901

DIVISION OF WATER RIGHTS - PERMITTING TEAM:

OFFICE OF CHIEF COUNSEL
1001 I Street
Sacramento, California 95814
BY: ERIN K.L. MAHANEY, ESQ.

---oOo---

INDEX

INDEX (CONT.)

---oOo---

SACRAMENTO, CALIFORNIA

TUESDAY, JUNE 4, 2002, 9:00 A.M.

---oOo---

CHAIRMAN BAGGETT: Good morning.

This is the time and place for the hearing regarding the legal classification of groundwater appropriated under Permit 14853, Application 21883, by the North Gualala Water Company. We are holding this hearing in accordance with water rights Notice of Hearing dated March 5th, 2002.

I'm Art Baggett, Chairman of the State Water Resources Control Board. With me today is Vice Chairman Pete Silva and Member Gary Carlton. I will be the hearing officer presiding over this proceeding. We are assisted by Staff Counsel Barbara Leidigh, Paul Murphey, an Associate Engineering Geologist.

The purpose of this hearing is to afford the permittee and interested parties an opportunity to present relevant, oral testimony and other evidence which address the following key issues:

Are North Gualala Wells 4 and 5 extracting groundwater that is subject to the laws governing surface water rights, including the requirement of a permit or license to appropriate water?

Would North Gualala extract groundwater that is subject to the laws governing surface water rights if it installs

and pumps groundwater from new wells on its property in Elk Prairie area?

At this time I will ask Barbara Leidigh to cover a few procedural items and introduce any staff exhibits into evidence.

MS. LEIDIGH: First of all, procedural items. The Board's Division of Water Rights served copies and notice of hearing on parties listed in the mailing list attached to the notice.

Next I would like to offer in evidence by reference staff Exhibits 1 through 13. These were served on the parties at the same time that other staff exhibits were served. I'm sorry -- it is just being handed to me we don't have SWRCB 8 in our file. I think we do have it.

We don't have SWRCB 8. There is no -- it is 1 through 7 and 9 through 13. And I would like to offer these into evidence at this point.

MR. LILLY: Good morning, your Honor. I am Alan Lilly of Bartkiewicz, Kronick & Shanahan, appearing on behalf of North Gualala Water Company, and I do have some objections to some of these staff exhibits. In particular I will just go ahead and state them.

Staff Exhibits 2 through 5 are the water right permit that was issued to the North Gualala Water Company in 1965 and then some orders, three orders regarding that permit.

And it is our position that that permit and those orders are not relevant to this hearing. This hearing concerns, as you have stated, two issues regarding the legal classification of groundwater, and those permits relate to the diversions of surface water from the Gualala River.

There has been a history of disputes as to whether or not a permit is necessary for these wells, and that's focus of this hearing. But, frankly, that permitting history is just not relevant to the groundwater classification issues in this hearing.

Next, regarding SWRCB 6, I have several objections to that. And just so you are aware, this exhibit, the files on Water Right Application 21 -- it says here 21883, and then it says Permit 14835. It's actually Permit 14853. This exhibit is quite voluminous. I looked at it yesterday afternoon. It took up a whole file cart. I think it had eight correspondence files, three accordion files with various reports in it, and then another accordion file with environmental documents in it.

And it is, to be begin with, very difficult for the other parties to just even deal with this level of volume, and, of course, it has not been provided to other parties. They have to come here to inspect it.

Secondly, the vast, vast majority of this exhibit is simply not relevant to this hearing. It concerns the water

right permit and surface water diversions and has nothing to do with legal classification of groundwater.

Third, a very substantial part of this exhibit is documents regarding settlement discussions between the parties. And as you know, Mr. Baggett, under the normal rules of evidence and even the looser rules of evidence that are allowed to this Board, settlement discussions are not admissible in proceedings.

Fourth, there is numerous unsigned documents that aren't authenticated, and there is really no way we can tell who wrote them or what they mean.

Fifth, frankly there is no way we can effectively rebut all that. I am very concerned that the Board's decision could just pull a document out of those thousands and thousands of pages when we really have no notice as to what documents they are going to pull out and suddenly cite, and there is no way we can rebut every single document in there without knowing which ones the Board is going to rely upon.

Regarding Exhibit 7, this is a complaint file regarding the Gualala River, and I read over that file. It is about an inch thick. It deals solely with compliance with the water rights permit, has nothing to do with legal classification of groundwater whatsoever.

Exhibit 8 apparently is not being offered because we weren't able to look at that at all.

Exhibit 12 is a geologic map. It is probably okay, but I have asked Mr. Murphey if I can see a copy of it. These are supposed to be available. So far he hasn't been able to get it from Department of Conservation, so I don't want it coming into the record until I've had a chance to see it.

Finally, Exhibit 13, the Water Quality Control Plan, I just don't see there is any relevance for that document to the legal classification of groundwater as well.

For those reasons we object to those exhibits. I guess just so we are clear on this, I do want to say one other thing. The statute requires me to say this or else I've waived the objection. Obviously, those numerous documents contain hearsay statements, and the Board's rules allow the Board to consider hearsay, but over objection can't be relied for a finding. And actually that goes to Exhibit 9 as well which is a report by an expert who is not even going to testify today. While that could be considered under the Board's rules, it can't be an independent basis for finding, so we object to its extent. It is hearsay.

CHAIRMAN BAGGETT: I think then we will not admit these into evidence at this time. We will at a later point before the end of this proceeding. So we have a chance to review those documents and take into account the objections you raised.

With that, our order of proceeding for this hearing

will be first get persons who wish to present nonevidentiary, oral policy statements an opportunity to do so. I don't see any blue cards, or do we have cards for them? If you can fill out a card.

MS. LEIDIGH: I understand National Marine Fisheries has a policy statement and I'm not sure who else.

CHAIRMAN BAGGETT: We'll take -- they are also a party. Cross-examination first.

Following the policy statements, we will receive testimony from permittee and his witnesses, followed by cross-examination by parties, Board staff and hearing officers. Following the permittee's testimony and cross-examination, the other parties may present testimony and have the witnesses cross-examined. I will allow relevant redirect and recross of all witnesses.

At this time I would like to invite appearances by parties. Will those making appearances, please state your name, address and whom you represent so the Court Reporter can enter this information into the record. And also if you have a business card it helps the reporter.

North Gualala Water Company.

MR. LILLY: Yes, Mr. Baggett, Mr. Carlton, Mr. Silva. I appreciate the opportunity of having this hearing this morning. I've introduced myself. With me at the table is John H. Bower who is the president of the North Gualala

Water Company. I will introduce our other witnesses as they come forward.

I did want to just clarify, we have not had a prehearing conference or anything on this. But regarding the order of proceeding, I just ask that the Hearing Officer reconsider this. Since there is a State Board staff team, they normally go first, right after the hearing team. Of course, that's up to the Board. But also and perhaps more important, when it comes to legal classification of groundwater, the parties asserting that the groundwater is flowing in a subterranean stream have the burden of proof. That is very clear under California case law. In most proceedings the party with the burden of proof goes first.

So we propose and request that the Hearing Officer reconsider this and have the order of the proceeding be the State Board team and then Fish and Game and Mr. Lucey as the parties who have the burden of proof and then North Gualala would respond to that since it does not have the burden of proof.

CHAIRMAN BAGGETT: Who is representing the Department of Fish and Game?

MR. BRANCH: Harllee Branch, H-a-r-l-l-e-e B-r-a-n-c-h, with Fish and Game, 1416 Ninth Street, Sacramento 95814.

CHAIRMAN BAGGETT: Division of Water Rights.

MS. MAHANEY: Erin Mahaney, Office of Chief Counsel,

State Water Resources Control Board, P.O. Box 100, Sacramento, California 95812, representing the Division of Water Rights Permitting Team.

CHAIRMAN BAGGETT: Who is representing Jerome Lucey?

MR. LUCEY: Jerry Lucey, 66 Manderly Road, San Rafael, representing the fish.

CHAIRMAN BAGGETT: And National Marine Fisheries is here for a policy statement.

DR. LI: Stacy Li, National Marine Fisheries Service, 777 Sonoma Avenue, Santa Rosa.

CHAIRMAN BAGGETT: We have two cards for policy statements.

Is there any other person who hasn't turned in a card who wants to make a policy statement?

Any other parties that we don't have?

Before we do policy statements I will administer the oath to those who are going to be witnesses.

(Oath administered by Chairman Baggett.)

CHAIRMAN BAGGETT: At this time we have two policy statements. A policy statement is a nonevidentiary statement. It may include the policy views and positions of the speaker and nonexpert analysis of evidence that has been presented. The Board will accept written policy statements also. Persons who wish to make only a policy statement may do so subject to the policy provisions:

The persons making such statement will not be sworn or asked to affirm the truth of their statements. Such persons must not attempt to use their statement to present evidence of fact, either orally or by introduction of written exhibits. At the discretion of the Hearing Officer questions may be addressed to persons making only a policy statement to clarify their statement. However, such persons shall not be subject to cross-examination by the parties.

With that, we have National Marine Fisheries.

DR. LI: Mr. Chairman, my name is Stacy Li. I am a water rights specialist for National Marine Fisheries Service and our statement is --

CHAIRMAN BAGGETT: Push the button on the mike on.

Thank you.

DR. LI: Our position, we are -- our responsibility is the consideration of the welfare for listed and national species. And this hearing is dealing with use of water and potential impacts to those species. We are -- I'm here to express the interests of our agency relative to any action that might affect those species whether the category of this groundwater, it's administrative distinction. And it is interesting in that all water comes from rain, and your Board is charged with managing water resources. So to the extent that -- I just ask your consideration to the extent that this affects listed species that you take that into

consideration.

CHAIRMAN BAGGETT: Thank you.

We have Mary Jo Deicke.

MS. DEICKE: Good morning, I am Mary Deicke. I'm here to represent the community, both the residential community. We're a very small rural area. I'm impressed to be sitting in this room with so many important people up there. It is a much simpler life. And an awful lot of our community are aging. Demographic shows a particularly large number of older people living on minimum, fixed incomes, and they need water.

I've been on the senior board for many years, and I talk with a lot of these people who are just desperately trying to survive. They usually are lucky enough to own a house they have been in for years. But the cost of utilities and food and certainly medicine are a big part of their life. And so I just really felt I wanted to come to speak to both the cost and availability of water in our small community.

Also from the business points of view the few businesses we have rely tremendously on water. A lot of them are tourist industry. Our busiest time of the year up there is late summer, fall. And any cost impacts, of course, are having to be passed on to the consumer. And so I would like to see the cost held down and keeping that in

mind, who the end users are.

Thank you.

CHAIRMAN BAGGETT: Any other policy statements?

If not, we have a request by counsel to reverse the order. I've decided we will remain in this order. We will go with North Gualala, Fish and Game, Water Rights. As the petitioners in this action is not a typical water rights proceeding. And I think the petitioner traditionally goes first in most actions. We will leave it at that. If it is any consolation, the way I do rebuttal is reverse the order. So in rebuttal that puts North Gualala at the end also. So you will have the opportunity to hear the rebuttal of the parties in reverse order after we finish the case in chief. And the way I prefer to run this is we will do the witness panel, cross-examination and then redirect and recross, then we'll go to the next party and then proceed to rebuttal, hopefully by tomorrow. We will see how it goes.

With that, opening statement.

MR. LILLY: Yes, thank you.

I will just have a very brief opening statement. By way of clarification, and I know, Mr. Baggett, you've been up on the field trip, which we appreciate very much, your taking the time to go out there and are generally familiar with this. But just to kind of bring the other Board Members up to speed, I would like to mention, as you point

out, this hearing is a little bit of a unique posture, maybe very unique posture is the way to put it.

I'm a little disturbed when people refer to North Gualala Water Company as either the permittee or the petitioner because it really is not either one of those in this hearing. North Gualala asked this Board to hold a hearing basically to determine whether or not its wells in the Elk Prairie area are even subject to the Board's water rights jurisdiction. So it is true we requested a hearing, but whether or not North Gualala has a water right permit isn't relevant to these hearings and definitely has not petitioned for anything. I just want to make sure we are clear on that.

CHAIRMAN BAGGETT: I understand.

MR. LILLY: By way of quick background, there has been dispute basically for the last decade or slightly more regarding the legal classification of groundwater for these wells.

North Gualala put in well No. 4 in 1989, which is now 13 years ago, without asking for a permit from the State Board or even for petitioning to change its prior water right permit, which is for surface water diversion. At the very end of 1992, the State Water Board received an opinion from an engineering geologist, Richard Slade, who worked for the Sea Ranch Water Company, which is across the county line

in Sonoma County. And basically he had been doing some investigation, exploratory reconnaissance level work, for Sea Ranch, concluded that North Gualala's wells were pumping from a subterranean stream and, therefore, were subject to the Board's water right jurisdiction.

The Board staff adopted that and sent North Gualala a letter saying, "You've got to get a permit or you are going to be in violation of law." We never had an opportunity to address that or respond to that until, frankly, today. There have been letters back and forth at staff level. Without going through all the history, we were a little miffed that staff made that determination back in 1992 without ever giving us a chance to respond, and we hope that the actions that occurred between then and now aren't going to be used as some indication or concession of what the Water Company did. The bottom line is we have a fresh issue today, and we very much appreciate the Board holding a hearing today and tomorrow so we can put in evidence on this issue and finally have a reasoned decision after all the evidence is presented.

We will have three witnesses this morning. The first witness, John Phillips, is a registered geologist with extensive experience in California and particularly very extensive experience working in the Franciscan formation, which is the geological formation that is involved in this

hearing. And he will testify in detail about both his experience in general with the Franciscan and his extensive field experience in the area of the Elk Prairie.

Next we will have Pat Cawood who is a stream flow measurement specialist with years of experience with the U.S. Geologic Survey in the field of stream flow measurements, who will testify as to the stream measurements that he took during the base flow period in the fall of 1998.

Finally, Joseph Scalmanini, a registered civil engineer with tremendous experience and expertise in the field of groundwater, will testify regarding the hydrogeology and particularly regarding the extensive field investigation, monitoring wells and analysis that he and his staff did in the Elk Prairie area.

We believe that the evidence will clearly show what is going in the Elk Prairie is that the groundwater is flowing through fractures in the Franciscan formation bedrock. This is a formation right -- about one to two miles from the San Andreas fault. That faulting has caused significant fracturing, and the groundwater flows through those fractures basically from a roughly north to south direction, comes out across the interface between that bedrock and the alluvial materials in the Elk Prairie and continues to flow in an almost southerly direction through those alluvial

materials, and ultimately a portion of that flow discharges into the North Gualala River. But a portion, a different portion, obviously, is intercepted by North Gualala's wells during the time, the cycles when they are operating.

It is our position because of that flow, basically from north to south, which is perpendicular to the direction of the stream and the direction of the what has been called an alluvial channel there, that that is not subject to the Board's jurisdiction. Basically, there is not a subterranean stream flowing through a known and definite channel, which is the statutory criteria for Board jurisdiction.

Basically, with that, that will be our position. With that, I am ready to call the first witness.

CHAIRMAN BAGGETT: Please.

---oOo---

DIRECT EXAMINATION OF NORTH GUALALA WATER COMPANY

BY MR. LILLY

MR. LILLY: Mr. Phillips.

Good morning, Mr. Phillips. Please state your name and spell your last name for the record.

MR. PHILLIPS: Good morning. My name is John T. Phillips. I am a registered geologist. Name spelled P-h-i-l-l-i-p-s.

MR. LILLY: Have you taken the oath this morning for

this hearing?

MR. PHILLIPS: Yes, I have.

MR. LILLY: Do you have in front of you a copy of Exhibit NGWC-1? If you don't have one, I can give you a copy here.

MR. PHILLIPS: That is my --

Thank you.

MR. LILLY: Please examine Exhibit NGWC-1 and then tell me does this exhibit contain an accurate statement of your education and work experience?

MR. PHILLIPS: Yes, it does.

MR. LILLY: Are you a registered geologist in the state of California?

MR. PHILLIPS: Yes.

MR. LILLY: Are you also a certified engineering geologist in the state of California?

MR. PHILLIPS: Yes, I am.

MR. LILLY: Please examine NGWC-2. Do you have that in front of you?

MR. PHILLIPS: I have those materials available, yes.

MR. LILLY: Does Exhibit NGWC-2 contain an accurate statement of your testimony for this hearing?

MR. PHILLIPS: Yes, it does.

MR. LILLY: Now I am going to ask you to just briefly summarize a few key points of your testimony. First of all,

please briefly describe your professional experience working as a geologist on projects involving the Franciscan formation.

MR. PHILLIPS: Yes. I have been working in the Franciscan formation as a professional geologist for a number of years, starting in the mid to late '70s. I was working for a geothermal exploration company based out of San Diego. However, my tasks were working in geologic exploration throughout the western states. For an extensive period of time I worked solely in the geysers in California, which is just north of Sacramento, Santa Rosa near the Healdsburg area.

Within the heart of the classic Franciscan terrain my tasks involved production, exploration and every aspect. It was a small geologic department. The production of geothermal resources is essentially a hydrothermal system plainly mining the earth's heat using fluids or water, in that case super heated steam. The occurrence of the steam is based on geologic conditions, subsurface geologic conditions, mainly structural features such as faults.

I personally mapped tons of square miles of that terrain, very detailed mapping. Surface conditions projecting those geologic features to depths of 10,000 feet. Correlating that information with geophysical data and actual down-home information from deep drill hole

locations.

Those conditions provided me an opportunity to work very detailed understanding of the Franciscan coordination.

Next, I proceeded to work with engineering firms, siting drill hole locations on the surface and hillside terrain on Franciscan conditions, which required a very detailed site-specific analysis of the physical properties of Franciscan formation, strengths, topography, geomorphic features, again land siting and lithologies of the Franciscan. It is very important to have a clear understanding of the engineering properties of that rock type to site the surface location of a well and its associated facilities, like a hazardous waste containment facility, a large 2,000 plus or minus gallon hazardous waste containment.

Later I continued working in the engineering field, went further into civil engineering projects, again physical strengths of the Franciscan formation, geologic hazards and so on, and have continued that research and investigation and evaluation of the Franciscan geology to the present day.

MR. LILLY: Please, moving forward in your testimony, please summarize the testimony you've submitted for today's hearing, the part of that testimony that concerns the Franciscan formation.

MR. PHILLIPS: Yes. The questions I addressed in my testimony was whether the Franciscan formation has a potential to be a water bearing formation, production of water wells within that formation and the potential for the Franciscan formation to provide the base flow for adjacent drainage systems.

Base flow is a very important consideration. It is the surface flow of drainage systems that occurs late through the precipitation cycle late in the spring, early in the summer and then throughout the summer and especially through the end of summer before the new rains the next season.

That base flow occurs as surface water that drains from adjacent aquifers that are contained in the hillside terrain. An aquifer generally is classified or defined as that part or a geologic formation, or a part of a formation, that is capable of collecting, storing and discharging water, groundwater, through springs, surface springs, or base flow or is able to be pumped out of the ground by wells.

My work in the Franciscan formation includes vast area from the coast, from the San Francisco area through Northern California and over to the Central Valley area where other formations start and occur as different geologic ends. During that evaluation I am able to locate producing water wells for people who have a hard time finding water in the

Franciscan.

Typically, the Franciscan has no primary permeability. These are geologic sedimentary rocks that were deposited in very chaotic and unique geologic environment. There is an awful lot of silts, sands, fine sands, clays and fine materials incorporated in this stratigraphic section. Those fine grained materials generally preclude production of water within that formation. There is no primary porosity. However, the Franciscan has very unique physical properties, whereas the sandstone material which is a portion of the Franciscan stratigraphic section, is probably the largest portion of that stratigraphic section, sandstone. It occurs in very random orientations through structurally complex vaulted systems, and that sandstone has physical properties that allow it to develop fractures. It is a very hard, very strong rock that does fracture readily in the tectonic environment as a result of mountain building and faulting earthquakes and so on.

Those fractures create the secondary permeability porosity that does support and are considered aquifers within that unit. Along with the fractures we have an extensive system of faults. The faults are essentially large fractures, and water is created -- and groundwater is created and contained within those systems.

MR. LILLY: I think you've already kind of gone on to

the next part of your testimony. Can you just be a little bit more specific regarding the aquifer production capacity of the Franciscan? You talked in general in terms of fractures, but in specifics is it possible to drill wells that can yield significant flows of water in this formation.

MR. PHILLIPS: Yes. As stated, the portion of the Franciscan that is considered water-bearing or aquifer, has aquifer capacity, is that portion which is generally a fractured sandstone and/or in conjunction with the fault system. Those geologic features must be identified by detailed investigation, valuation. Once those features are identified, a prediction of their occurrence at some depth must be determined and a drilling program is designed to drill into that system at a depth, and over time been very successful in finding numerous wells that produce often residential quantities of water, other times industrial quantities of water for agricultural use and so on, large volumes.

MR. LILLY: I was just going to ask, so industrial or agricultural quantities are significantly greater than residential quantities?

MR. PHILLIPS: Yes. The needs of some users require hundreds of gallons per minute. And the needs of other users requires just a few gallons a minute. When those few

gallons are achieved, the exploration, as it might be, ceases and the production well is in place. If the user needs hundreds of gallons a minute, a very detailed investigation is considered to locate a possible source, large section of fractured sandstone or possibly a fault zone to drill into.

MR. LILLY: Finally, please summarize your testimony regarding your observations of springs in the vicinity of the Elk Prairie and your opinions on the discharges of flows of water from the Franciscan formation to the adjacent streams and rivers in that area.

MR. PHILLIPS: I had the opportunity in the last month or so to spend a great deal of time in the Elk Prairie area, working specifically in the Franciscan portion, which is located on the east side of San Andreas Fault zone. And there are numerous geologic deposits. There are granular alluvial deposits, older alluvial deposits, terraced deposits, and older marine erosional surfaces. Then even older sedimentary deposits lying about the area. And underlain the bedrock geology is fractured Franciscan.

The fractured Franciscan is exposed at numerous locations. The area has been heavily logged in the past. Lots of skid trails and roads that have been cut through the area, and there is a great opportunity to observe the entire section at various locations. I have mapped countless

springs as well as a number of springs that I consider to be bedrock source spring, which is a spring that is emanating directly from a groundwater aquifer contained on the hillside. Those springs generally -- I have found they are in conjunction with faults that I have mapped in the area.

MR. LILLY: Specifically, in your opinion, can discharges of groundwater from the Franciscan formation flow -- this is just north of the Elk Prairie flow -- in a southerly direction into the alluvial materials under the Elk Prairie and on south toward the North Fork of the Gualala River?

MR. PHILLIPS: Yes. The topographic feature north of the Elk Prairie wells rises a thousand, 1,400 feet above the valley, the Elk Prairie area. That hillside is -- bedrock conditions are fractured sandstone. There are shale deposits within there, however, a majority fractured sandstone. Fractures are ubiquitous. And with my experience and past understanding of the Franciscan formation and the observations I have made in the field indicate that, in fact, that hillside, that topographic feature, does contain aquifers that are draining through -- both toward Elk Prairie as well as you get onto the north side of the flanks of the slopes. There are bedrock springs that are draining west into the San Andreas Fault zone that will potentially drain through the older alluvial, saturated

over alluvium, and drain through the Elk Prairie area.

MR. LILLY: Thank you.

I don't have any further questions on direct and move forward and call Mr. Cawood to come forward.

Mr. Phillips, you can stay there. We are going to need you for cross-examination.

Good morning, Mr. Cawood. Please state your name and spell your last name.

MR. CAWOOD: Patrick Cawood, C-a-w-o-o-d.

MR. LILLY: Have you taken the oath for this hearing this morning?

MR. CAWOOD: Yes, I have.

MR. LILLY: Do you have a copy of Exhibit NGWC-3 in front of you?

MR. CAWOOD: Yes, I do.

MR. LILLY: Does this exhibit contain an accurate statement of your education, professional work experience and technical publications?

MR. CAWOOD: I believe so.

MR. LILLY: Very briefly, and I know you have done a lot, please just briefly describe your professional experience on measuring supreme flows.

MR. CAWOOD: Just for the part that is relevant to this study, I worked for the Geologic Survey for 11 years and learned the fundamentals of stream flow measurements. From

my opinion, the best in the business.

I then later worked for Zone 7 in Alameda Flood Control District in Livermore Valley where they had an extensive -- they are trying to develop an extensive conjunctive use program, which is the recharge of surface water in the groundwater and the pumping of the groundwater at their convenience for drinking water, et cetera. The idea was to buy SPA water, directed it into three stream systems and make it a recharge. My job was to find where the recharge was taking place and where it was not taking place, when was it sensible to spend money on aqueduct water and when was it not. Of course, I made 1,500 measurements in three years.

And I learned something that I hadn't learned in geologic survey which is how to find differences between measurement A and measurement B. Find the difference between the two measurements, a whole different set of rules. Have to be much more accurate. I developed techniques for accurate stream gaging. The type of measurements I make go all the way from portable flumes and portable weirs, piezometer measurements, AA current meter measurements, measurements from wading measurements, range measurements, cable measurements, et cetera.

MR. LILLY: Okay. Now let's go forward. If you can please examine Exhibit NGWC-4. Do you have a copy of that in front of you?

MR. CAWOOD: Yes.

MR. LILLY: First of all, before I ask you whether it is an accurate statement of your testimony, do you have any corrections to this exhibit?

MR. CAWOOD: Yes, there is one. They were made on 9/11 not on 9/12, those measurements.

MR. LILLY: So on the first page I think there is a reference in about the fifth paragraph down where it says 9/11/98, and then there is another reference down near the bottom of the page -- excuse me, it says 9/12/98 and down farther it says 9/12/98. Each of those should be changed to 9/11/98?

MR. CAWOOD: That's correct.

MR. LILLY: Do you have any other corrections?

MR. CAWOOD: I don't think so, no.

MR. LILLY: With these two corrections, does exhibit NGWC-4 accurately describe your testimony for this hearing?

MR. CAWOOD: Yes.

MR. LILLY: In particular do the tables in Exhibit NGWC-4 accurately list the stream flows that you measured on the indicated dates?

MR. CAWOOD: Yes.

MR. LILLY: Do you have a copy of Exhibit NGWC-5?

MR. CAWOOD: Beautiful map, this right here.

MR. LILLY: I assume you prepared this starting with

the USGS topographic maps?

MS. CAWOOD: Made from seven and a half minute USGS maps. I used a computer program.

MR. LILLY: Does Exhibit NGWC-5 accurately show the points where you measured the stream flows that are referred to in your testimony?

MR. CAWOOD: I believe so, yes.

MR. LILLY: Thank you.

I don't have any further questions for Mr. Cawood. I'll move forward to Mr. Scalmanini.

Good morning, Mr. Scalmanini. Please state your name and spell your last name slowly.

MR. SCALMANINI: Joseph C. Scalmanini, S-c-a-l-m-a-n-i-n-i.

MR. LILLY: Have you taken the oath for this hearing?

MR. SCALMANINI: I have, yes.

MR. LILLY: Do you have a copy of Exhibit NGWC-6 in front of you?

MR. SCALMANINI: Yes.

MR. LILLY: Does this exhibit contain an accurate statement of your education, professional work and techinical publications and presentations?

MR. SCALMANINI: Yes, it does.

MR. LILLY: Are you a registered civil engineer in the state of California?

MR. SCALMANINI: Yes.

MR. LILLY: What is your area of specialization within civil engineer?

MR. SCALMANINI: Pretty exclusively respected to water resources engineering and groundwater hydrology work.

MR. LILLY: Please examine Exhibit NGWC-7. Does this exhibit contain an accurate statement of your testimony for this hearing?

MR. SCALMANINI: Yes.

MR. LILLY: I realize this exhibit is quite long and we are only allowed 20 minutes, so I'm going to ask you to summarize the key points. The whole exhibit will go into the record.

First of all, what were the scope and objectives of your investigation of geologic and hydrologic conditions in the Elk Prairie area?

MR. SCALMANINI: They were really twofold. One, to basically investigate and describe the occurrence of groundwater and whether or not it fits the description of groundwater flowing in a known and definite subterranean stream channel. Secondly, to assess whether or not pumping of water supply wells by the North Gualala Water Company for current or projected water demands would intercept groundwater flowing toward the North Gualala River or whether it would induce water to flow out of the stream, to

meet some of the discharge of those wells.

MR. LILLY: After conducting this investigation and performing the follow-up analyses, what conclusions did you reach?

MR. SCALMANINI: Well, two. The first one, that the occurrence of groundwater at the Elk Prairie, which is where the subject wells are located, does not fit all the technical tests or required criteria for water flowing in a subterranean stream channel. And, secondly, that the pumping of wells, well when we started, singular, and wells, plural today, which I can describe later, does not and will not induce water to leave the stream and enter the aquifer system to meet some of the discharge of wells, but rather they can be pumped -- they are pumped today and can be pumped in the future in such a way that they will intercept groundwater that is otherwise flowing toward the stream.

MR. LILLY: I am going to ask you just a few questions so you can provide a few details on how you reached those conditions. And I notice, Mr. Brown, your assistant/colleague here, is operating the computer and the Power Point, so please, as necessary, refer to the figures of your testimony. But so our record is clear, please make sure to list or say each figure number as you refer to that and we'll begin.

Please first just briefly describe the geology and

aquifer materials in the Elk Prairie area.

MR. SCALMANINI: Well, we heard some reference to the Franciscan formation already this morning. I might summarize by saying that to determine this there was a bit of field investigation work that went on, a series of sequential steps that started with some geophysical investigation or exploration at the Elk Prairie, the location of which is illustrated very generally on this first Figure 1 of my testimony. I'll get into more details as we move along.

We proceeded from geophysical exploration to the drilling and logging and geophysical testing, if you will, of a number of bore holes on the Elk Prairie to define the subsurface materials and to confirm some of the geophysical work. We ultimately constructed monitoring wells and a second water supply well, known as Well 5. As you said in your opening remarks this morning, the North Gualala Water Company had constructed a Well 4 in 1989. Our work was continued beginning of 1996 and continued through 1997.

There is extensive groundwater stream monitoring that followed and well and aquifer testing that followed and I can get into those details later. Going back to the first parts of that, the geophysical exploration work, suggested that in the subsurface there is located a definable change in formation from alluvium, which is present beneath Elk

Prairie and beneath the North Gualala River and adjacent to that river, the Elk Prairie location, and ultimately at depths, typically as deep as 170 feet. And in the location of water supply wells about 140 feet below the ground surface, the subsurface morphology changes from that alluvial materials which are sands and gravels, some silts and clays to a consolidated fractured material known as the Franciscan formation.

To illustrate that, generally, we have prepared three geologic cross-sections, the locations of which are illustrated on this Figure 2, which is projected here. One basically parallel to the stream and two across the stream channel. Perhaps in the interest of time, since Sections AA and BB, which are two that are across the stream channel, generally similar, we can go to one or the other. I think AA comes up first in Figure 3.

A lot of the business of the detail in Figure 3, which is clear in the paper copies and in the testimony, is a little clouded here, but what you can see in general as projected is a contact with the bedrock formation which is labeled to the lower left where it is open white space on that projection. And then the dark parts of what's projected, but you can see from the legend in Figure 3 in the text are layers or sections of sands, gravels, silts and clays, which form the alluvium in which the water supply

wells and ultimately the monitoring wells we talked about are completed.

MR. LILLY: Why don't we keep on moving forward. We can skip figure four. Do you have anything you need to say about Figure 5?

MR. SCALMANINI: I don't think it is necessary. They basically all paint a similar picture, which is that there is a finite depth of alluvial materials, as I said, of maybe to 170 feet at the deepest point, and thinner as one moves certainly where it's been investigated more to the north away from the stream. And there hasn't been any detailed investigations to the south, either geophysically or lithologically, meaning drilling holes in the subsurface, but logically suggest that similar pictures exist on that site.

MR. LILLY: Let's go forward to Figure 6 from your testimony. I will ask you to just briefly describe the various types of information data, information and data, that you and your staff collected in the field.

MR. SCALMANINI: Well, as I said at the outset, what took place in terms of this investigation of the occurrence of groundwater and the pumping effects at Elk Prairie was sequential. And so after some definition of the subsurface as I just briefly went through, it was obvious -- I guess I should back up a half a step and say from when I first went

there, you can stand on the banks of the Elk Prairie and you can wash groundwater discharge into the North Fork of the Gualala River, which suggests that from some source there is a water supply that is, if you will, recharging groundwater to a sufficient extent to cause a discharge of groundwater into the stream from beneath this entire Prairie.

So one of the things, given the number of tests that go into the definition of a subterranean stream channel, has to do with flow in that channel and the confinement of flow in that channel. So we installed a number of monitoring wells and production wells, the locations of which are illustrated in this Figure 6. They are installed in a geometric pattern that would allow us to identify the direction and gradient for flow under whatever conditions would ultimately be encountered. Strictly speaking, if you look at those, they are in sort of a multiple triangular patterns that would allow the gradient and its direction to be -- direction for flow, the result and direction for flow to be determined.

A second or backup water supply well was installed. That is called PW for production well No. 5. PW-4, the originally installed well in 1989 is also noted on that. And of note with regard to those as far as initial field observations is that both wells were tested by the water well drilling contractor when he installed them and determined that they have very high yields. They have very

high specific capacity which is the ratio of the discharge capacity to the amount water level drawn down in the well while it's being pumped. And the identification of high specific capacity is indicative of highly transmissive or highly permeable water-bearing materials, and it also suggests that since the drawdown is very small that it is possible that the pumping of those wells may not cause the water level gradient to be changed in such a way that the pumping of them would induce water to come out of the streams.

However, you can't just conclude that from looking at high yield levels, and so subsequent fieldwork went on from there.

MR. LILLY: Go ahead.

MR. SCALMANINI: I will go on with some of the other fieldwork, if that's okay, just to finish it up.

After the installation of that network, then regular water level monitoring was conducted for basically a year prior to some focused aquifer testing the locations to determine more specifically some of the details I just talked about which is the yield in the wells and their impact on groundwater levels when they are being pumped. The intervening measurements -- we can go forward to Figure 7.

MR. LILLY: Figure 7 is now up.

MR. SCALMANINI: Intervening measurements were collected at the production wells and all the monitoring wells and at three locations which were installed at that river to measure its stage.

And what is included in Figure 7 and in subsequent figures are illustrations of the relative elevations of groundwater at the production well in red, at the monitoring wells between the production well and stream in blue and at the stream itself in green.

As you can see, continuously through the period of time that was measured regularly, which was '97, late '96 through '97, and then sporadically since and continuing today is basically a predominant gradient for flow in the most northern location, which is the location of the production well toward the monitoring well, between the production well and the stream and ultimately toward the stream.

MR. LILLY: Why don't you just briefly go through Figures 8 and 9 and 10, and tell us if they show similar pattern.

MR. SCALMANINI: Those are basically similar patterns. This is located -- this pair of monitoring wells and stream gauge is located between production wells four and five --

MR. LILLY: Excuse me. This is now Figure 8 we are on.

MR. SCALMANINI: That is correct. And the next, Figure 9, is located yet farther, if you will, upstream or toward

the eastern end of Elk Prairie. And while the gradient is flatter, meaning that the water level differences between production well and monitoring well and the stream are less, there is still a progressive gradient for flow from inland, if you will north, on the Elk Prairie toward the stream, predominating through basically the entire year.

MR. LILLY: Go ahead with Figure 10. Are you at Figure 10 now?

MR. SCALMANINI: Let me just catch up with you on numbers.

MR. LILLY: Multi media here.

MR. SCALMANINI: Go to Figure 10, if you want.

MR. LILLY: Let's go back to Figure 10. We'll just go to Figure 11. That is fine.

MR. SCALMANINI: Figure 10 and 11 show contours of equal groundwater elevation derived from the measurements made at the monitoring wells, the production wells and the stream gauges at two different times of the year under high flow conditions and under low stream flow conditions. This is one of the two that shows basically the same type of thing. And that is a gradient for groundwater flow that is across the channel that one might interpret to be there going back to Figures 2 and 3, I think, and 3 and 4, that there is a predominant flow from north on the Elk Prairie toward the stream under basically high and low stream flow

conditions, which is responsive to the type of gradient that was illustrated in the three proceeding figures, which were 7, 8 and 9.

MR. LILLY: Okay. I don't want to interrupt you.

Do you have anything else you want to talk about on the types of information and data that you collected in the field?

MR. SCALMANINI: There were probably a couple other noteworthy things. Number one is, I mentioned that part of our task was to look at the affect of pumping on this flow system and whether or not pumping would induce water to come out of stream in contrast to what is shown here as a predominant stream flow.

There was extensive aquifer testing conducted in production well No. 4 in late 1997. One test for 80 hours, another for 24 hours. I might note that just to put that in context that typically to meet its water demands today the North Gualala Water Company pumps those wells about ten minutes every hour on average year round. So we pumped that extensive time in part to investigate aquifer characteristics, but also in part to push the envelope well beyond what is currently pumped or what might be pumped in the future to meet water demands, and ultimately determined as shown -- I'm getting a little ahead of myself.

In is in Figure 15, when we finally get there, that

there is no reversal of gradient as a result of pumping that would induce water to come out of the stream. However, we can probably stop there with the fieldwork, and we can talk about interpretation.

MR. LILLY: Why don't you go forward and talk about what the specific question of can the North Gualala Water Company pump groundwater from the Elk Prairie to meet its current and projected water requirements without inducing any flow of water from the North Fork Gualala River into the aquifer under the Elk Prairie?

MR. SCALMANINI: Sure. I started to introduce it accidentally a minute ago. Basically, when we did our work the North Gualala Water Company had a total water requirement of about 190 acre-feet a year, which is significantly small. That is projected to increase slightly with time. There have been two projections of future water demands.

One that was done or existed at the time we did our work, which was a 20-year projection to 2016. Subsequently that's been updated in the last five years, and is now projected to go out to the year 2021. But under those conditions where the demand for water from the Elk Prairie today averages out to be about 41 gallons a minute. That might increase to something in the range of 80 to 110 gallons a minute in the future, which suggests that if the

pumping capacities that these wells are equipped to pump, which is nominally about 260 gallons a minute, or a little more than half of a cfs, that they would increase in pumping from on average about ten minutes an hour on average to maybe 20 to 30 minutes an hour. But they would never be pumped on a continuous basis as they were tested.

Using first the observations during the extended testing, as well as just the regular monitoring, which I illustrated up there a few minutes ago, which was continuous through the year 1996, all the while North Gualala Water Company was using Well 4 for its pumping, there is never any evidence of any reversal of gradient during actual pumping condition on an ongoing basis, basically throughout an entire year, that is at the former demands.

For purposes of looking at the future we designed, I'll call it, a couple of conceptual well fields which would include either the two existing wells or could include a couple of others which are located in similar locations but within the footprint of property that is owned by North Gualala Water Company out there. So that pumping could be distributed in such a way and pumping cycles could be managed in such a way that the gradient for flow would basically never be reversed. And included -- I have left out a couple of details along the way. But included in Figure 15 is an illustration of basically the actual pumping

contours during the pump testing in 1997. And included in our report, the exhibit number of which escapes me right now, but --

MR. LILLY: Your report is Exhibit NGWC-8.

MR. SCALMANINI: Included in there are 16 different scenarios which we examined for different pumping patterns with different wells at different capacity, including the two existing wells and two hypothetical wells that might be located out there. As a means of, as I said a few minutes ago, manage pumping cycles to avoid inducing water to come out of the stream. Of those 16 scenarios 12 can successfully accomplish those goals. Four of them would not and shouldn't be put in a practice if that was what the objective was, which is to avoid inducing water to come out of the stream.

In the simplest of form, and maybe we can fast-forward to Figures 16 and 17 attached to my testimony here.

MR. LILLY: Here is Figure 16 on the screen.

MR. SCALMANINI: And Figure 17 represents a slightly different scenario. Basically, what I have just been describing in schematic form here, illustrated in Figure 16, is the objective of trying to manage a well field in the simplest of forms, where the well is located on the Prairie, in this case north of the North Fork of the Gualala River, and you pump at a capacity and duration such that drawdown

in the water well is limited, and the cone of depression that forms around the pump well does not ever extend or deep enough or far enough to reverse the gradient for flow that is predominant toward the river.

And if you look at the next figure, the situation that one would try to avoid, would be this, which is to pump in such a way that the drawdown in the pumped well is sufficient to cause a cone of depression both because of time and pumping capacity to extend out to the vicinity of -- environs of the river and reverse the gradient and cause water to be induced to come out of river.

What I just described with the four unacceptable scenarios would be this picture and the 12 acceptable scenarios that are on my report and in the preceding Figure 16.

MR. LILLY: This picture is Figure 17?

MR. SCALMANINI: Figure 17, that's correct.

MR. LILLY: Finally, unless I've cut you off from anything that you need to add, if we can maybe go back, Mr. Brown, into figure 14, and Mr. Scalmanini, I would like you to just summarize your analysis of the occurrence of groundwater in the Elk Prairie and, in particular, whether or not that groundwater is flowing in a subterranean stream through a known and definite channel.

MR. SCALMANINI: Well, we have -- recognizing the

contours of equal groundwater elevation that were plotted in the figures that I had up here, for example, in Figure 10 and 9 and in my testimony, at different times of the year, we recognized that there is a prevailing gradient, particularly when you look at the time series of water level measurements that were included in Figures 7, 8 and 9, that there is for all practical purposes a constant gradient for groundwater discharge from north to south toward the river across Elk Prairie throughout the year.

And in order for that to be the case there needs to be some source of water to sustain that. It can't just keep discharging groundwater by itself, it, the aquifer system, without some recharge from someplace.

We examined various potential locations from which such recharge might come. And basically, particularly given the nature of the gaining reach, which means that groundwater is flowing toward the stream and not away from the stream, it is not replenishing the aquifer system by discharging into the ground. The opposite to that is receiving water from the groundwater system. So the only two places that groundwater can come from to sustain or recharge and flow to the river on a continuous basis from north to south toward the North Fork Gualala River throughout the year is either from the depletion of groundwater storage on the northern side of Elk Prairie or from sustaining recharge that comes

across the boundary between the alluvium of the Prairie and the consolidated aquifer materials, fractured as they are, from the north. That is the Franciscan formation.

In examining the water level contours and particularly the hydrographs for groundwater elevation versus time on the Elk Prairie, it is impossible for depleting groundwater storage in the alluvium to sustain that flow. If it were doing that, then the water levels would decline in groundwater faster than they are declining at the stream, as the stream subsides in flow at time. That doesn't occur. The water level measurements on a more or less continuous basis for one year and intervening subsequent time periods all show that that is not the case.

So that leaves only to sustain the predominant and prevailing groundwater flow direction, a small discharge of groundwater which is basically water that accumulates in the secondary porosity and is drained by the secondary permeability which was described by Mr. Phillips earlier.

MR. LILLY: This is the secondary permeability in the Franciscan?

MR. SCALMANINI: Franciscan formation, yeah. Just about to say that. Discharges to the south to support the gradient that I have shown and described. I guess you could say interested -- if you want to move forward -- in this case I guess we can move back to Figures 11 and 12. We did

some fieldwork -- go forward one please. There you go.

MR. LILLY: We have Figure 12 up on the screen.

MR. SCALMANINI: We did some exploration in the field to look at discharge from the Franciscan formation. And this is the best of a not great set of photographs to illustrate, what I will call, a straight on look at the side slopes of the Franciscan. This would be east of Elk Prairie, it is the best photograph we could capture. This is basically a perennial spring that I understand is also plumbed so the construction workers in this area can use it for water supply on a stop and fill your bottle basis throughout the year.

But this kind of condition is prevalent, but in smaller type observations above the ground surface at locations shown in the next figure, some of which -- they are all numbered. They are immediately north of Elk Prairie. The sites numbered one, two, and three. They're at the east end of Elk Prairie which is four and five. You can see seeps and spring-type discharges above on the ground surface, all of which suggest a higher head, meaning a higher water level in the Franciscan formation to the north, and then a slow drainage of that which supports some riparian-type vegetation near the ground surface and some bog-type conditions near the ground surface which suggests two things.

Number one, a recharge, if you will, from infiltration at the top of the Elk Prairie to the north, and, secondly, the probability of subsurface flow or transfer, if you will, from the Franciscan through the alluvium and headed toward the North Fork of the Gualala River which is immediately to the south of the Elk Prairie.

Lastly, the same type of conditions are observable at the locations listed in 6 and 7 to the east as one follows, I think it is, a logging-type road that traverses to the east along basically the north bank of the North Fork Gualala River.

MR. LILLY: Does that complete your testimony, your summary of your testimony? Go ahead if you have any concluding remarks.

MR. SCALMANINI: The concluding remark would basically be, I think I concluded enough as regards to the pumping impacts, but as regards the occurrence of groundwater or, I'll call it, the technical components required for groundwater to be confined within a subterranean stream channel, there are four requirements. And they simply are: that there be a channel, that it have relatively impermeable bed and banks, that the course of the channel is known or can be determined by some reasonable inference, and lastly that there is flow in the channel.

I took the time because several people referred to the

Garrapata decision. I think the most recent one by this Board on this subject. And when you look at Garrapata, there is a quote of the fundamental, whatever it is, law or case, which is the Los Angeles Pomeroy case, that makes specific reference to flow being confined within the channel.

And in looking at the four characteristics or tests that I just went through: Is there a channel present? Probably so. You can map something up there that looks like a subterranean channel. Is there a relative impermeability? Well, in terms of pure numbers the formation to the north, the Franciscan formation, is relatively or comparative lower in hydraulic conductivity or permeability than the alluvial materials. Is there a course of channel that could be defined? Probably so. We can map it reasonably so with the work that's been done to date. But is the flow confined to that channel or is it flowing in that channel? And the answer is absolutely not. It is flowing across the channel and there is no confinement of flow as shown by the need for recharge to come across the boundary on the north side.

As regards that part of our original scope that, this particular occurrence of groundwater fails that piece of the test.

MR. LILLY: That is basically because there is a flow

across the boundary and then across the channel rather than a flow along the channel without any flow across the boundary?

MR. SCALMANINI: That's correct.

MR. LILLY: I have no further questions.

CHAIRMAN BAGGETT: Let's take a ten-minute recess, and we'll come back and do cross-examination by Fish and Game. Recess.

(Break taken.)

CHAIRMAN BAGGETT: Before we begin cross, I think I want to clear up the record on these objections on the State Board's exhibits. I would like to resolve that right now.

I have decided, obviously, State Board Exhibit 1 is a notice.

Exhibit 2 is the permit. I feel it is relevant.

Exhibits 3, 4, 5, the previous orders, we will withdraw those.

Exhibits 6 and 7, there was an objection on the hearsay. We will put them in the record, but with the hearsay proviso. They will be only accepted as background material and as a hearsay. So the weight of evidence won't be used in making determinations.

Nine, I don't know that there was a clear -- was there an objection, Mr. Lilly, to the Slade report? It's been referred to in your own testimony.

MR. LILLY: It was just the same objection, that it's hearsay. Obviously, Mr. Slade is not testifying. So I think it should be admitted subject to the limitations on hearsay. It is basically a statement by somebody who is not here. I think it can come in, but subject to the limitations on the use of hearsay evidence.

CHAIRMAN BAGGETT: Does any other party have --

That's appropriate.

Ten and 11 are USGS maps. I didn't hear any objections to those. I understand the geologic map, as I recall, is part of Fish and Game's testimony already.

MR. CUSTIS: A newer or detailed map.

CHAIRMAN BAGGETT: I think we can probably withdraw that since it is going to be entered in at a later date.

Thirteen, I would -- we will withdraw that exhibit also, North Coast Regional Board's plan. There was a relevancy objection. It clearly isn't the focus of this hearing.

So that is the -- with that we will -- with those provisos we will enter the State Board's exhibits, will be admitted into the record.

With that, let's resume, cross-examination.

---oOo---

CROSS-EXAMINATION OF NORTH GUALALA WATER COMPANY

BY DEPARTMENT OF FISH AND GAME

BY MR. BRANCH

MR. BRANCH: Thank you.

Mr. Scalmanini, I have a few questions for you.

First, in your testimony you mentioned some seeps and springs coming from the Franciscan complex on the north perimeter of Elk Prairie.

Do you recall that?

MR. SCALMANINI: Yes, I do.

MR. BRANCH: When were these springs identified?

MR. SCALMANINI: Well, by whom?

MR. BRANCH: By you.

MR. SCALMANINI: They were called to my attention by John Bower of North Gualala Water Company. I don't know when they were first, quote, identified. But they have been apparently for a long time, as long as people have been traversing up the road that I referred to in one of my last figures.

MR. BRANCH: The first you became aware of it was?

MR. SCALMANINI: As part of this investigation.

MR. BRANCH: Do these springs, to your knowledge, flow all summer?

MR. SCALMANINI: Basically, yes. The one I showed the photograph of is a perennial discharge, as a matter of fact, not far out of that photograph, as in a few inches from the way I framed it, is a piece of PVC pipe that's installed to

that spring so that, I think I made reference to, workers and people up there can fill bottles and things of that type. It's been there -- I don't know if Mr. Bower is going to testify, but he conveyed to me that that's been a regular stop for water supply for years.

MR. BRANCH: Is any of this information in your written testimony?

MR. SCALMANINI: That part of it, no, I didn't talk about that.

MR. BRANCH: You say the springs, do they flow all summer? Was that in your written testimony?

MR. SCALMANINI: I don't think I specifically made reference to that in the testimony, no.

MR. BRANCH: Do you know what the approximate flow rate and order of magnitude is for the spring flow?

MR. SCALMANINI: The springs and seeps are -- none of them is quantified. They vary from, I'll say, fractions of gallons a minute to maybe several tens of gallons a minute at different locations. Ultimately --

MR. BRANCH: Is that information in your written testimony?

MR. SCALMANINI: No. Ultimately the point of observing those is not to try to quantify a discharge to the ground surface as a component of flow, but rather to show that is an elevated head, meaning water level, in the Franciscan

formation above the ground surface as you can observe it at the edge of the Prairie or the edge of the alluvium as one that goes upstream from the Prairie, that would suggest that the Franciscan has sufficient water in storage that it can discharge because it is at a significantly higher head. The surface observation is simply to show that it will come out.

What really counts as far as, call it as far as I am concerned, the only plausible support for a sustained groundwater discharge and flow direction south across Elk Prairie and to the river is that there is water moving from the Franciscan underground into the alluvium and then toward the river.

MR. BRANCH: And what would be the groundwater elevation gradient in the bedrock? Do you have any information on that?

MR. SCALMANINI: No. I used for purposes of some calculations -- let me go back a little further to a response to your last question, and that is how much flow. Using the same gradient -- you're from Fish and Game?

MR. BRANCH: Yes.

MR. SCALMANINI: Using the same gradient that was cited I think in both your expert's and the expert from the State Board's team that was basically assumed in Garrapata and assumed here as well, if you use that gradient and the

approximate aquifer characteristics which can be extrapolated from well yields which had been cited in the groundwater study in the Mendocino County area, that you could compute approximately cfs or more of subsurface discharge to the alluvium from the bedrock in the vicinity of Elk Prairie, which is consistent with the amount of gauged stream accretion in that area as is documented in Mr. Cawood's testimony.

MR. BRANCH: You describe the seeps and springs as being evidence of water yield and capacity from the bedrock, correct?

MR. SCALMANINI: I don't know if I used the word "water yield and capacity," but they're evidence of water that's accumulated in that formation and will discharge from that formation.

MR. BRANCH: The water that comes out of these seeps and springs, it could be a significant amount or it could be a relatively insignificant amount, correct?

MR. SCALMANINI: Why don't you define the word "significant" and "insignificant"?

MR. BRANCH: Could be -- I don't have a figure for gallons per minute or anything, but it could be large amount of water coming out or it could be a relatively small amount of water coming out, but we have no data on that or you have presented no data on that, have you?

MR. LILLY: Excuse me, I'm going to object that when he talks about coming out, it is not clear whether the question means coming out into the surface where it can be seen or coming out of bedrock into the alluvium.

CHAIRMAN BAGGETT: Please clarify.

MR. BRANCH: Discharging from the seeps and springs either onto the surface or into the ground.

MR. SCALMANINI: Well, words like "large" or "small" or "significant" or "insignificant" are all relative. So in this setting I will say that with the observed water level difference in the bedrock complex north of Elk Prairie, which suggests that there is high head, meaning that the water levels are significantly higher in that formation than they are in the Prairie and immediately adjacent to it to the south, and the fact that both with stream gaging and observation of groundwater flow direction in the upper Prairie and stream gaging adjacent to it, the stream is gaining something on the order of a cfs as it passes from the east end to the west end of Elk Prairie.

As I just said with some assumptions about gradient and some extrapolation of yield type numbers for hydraulic conductivity numbers, it is possible to compute that the flow from the bedrock would be on about that order of magnitude. Now, in many people's context a cfs of groundwater flow is an extremely small amount of water. But

it appears in that setting that there is enough drainage from that formation to support the gradient for flow that is sustained on a year-round basis with no other obvious source of water to sustain that gradient.

MR. BRANCH: Does the springwater flow over the grounds in your observations?

MR. LILLY: Let me just object. It is vague as to location. I don't know whether he is talking about where he talked about the springs or somewhere else.

CHAIRMAN BAGGETT: Sustained.

MR. BRANCH: When the water discharges from these springs that have been identified, after it discharges from these springs does the water immediately flow over the ground after it discharges?

MR. SCALMANINI: I looked at the, I will call it springs and seeps that were numbered on that Figure No. 13, and the answer to your question strictly speaking is both, that at some places the seeps are quite small, and they might be gathered in a small drainage-type compression immediately adjacent to the discharge, and at a couple places to the east where the roads have been cut then the discharge from the spring is for all intents and purposes sort of diverted by the road and ultimately gets to a culvert that goes under the road and discharges into the North Fork Gualala River. And immediately north of Elk

Prairie there is, call it, an accumulation of water on the ground surface at least sometimes in the year that pools at everything from tire ruts to just low depressions, and there is some sustaining of some vegetation by that water. So there is everything from pooling to very small flows in depressions to infiltration to, call it, groundwater water to culverts.

MR. BRANCH: Are you familiar with the DWR reports by Parfitt and Germain from 1982 or the 1975 report by Ford? They are in the Department of Fish and Game exhibits.

MR. SCALMANINI: I have Parfitt and Germain here. I don't have Ford here.

MR. BRANCH: Have you -- are you familiar with those?

MR. SCALMANINI: Probably more familiar with -- the DWR one is dated what year again?

MR. BRANCH: 1982, Parfitt and Germain.

Do you disagree with the conclusions made in there where they say groundwater is in limited supply in the Franciscan coastal belt graywacke?

MR. SCALMANINI: I have not done any analysis to agree or disagree with the conclusions. Point out to you that the entire study area of that report is disconnected from the area we are talking about here. None of this extends east of the San Andreas Fault into the vicinity of Elk Prairie.

And so whatever conclusions were drawn with regard to the, call it, coastal belt Franciscan formation were drawn with regard to that as a water supply for other areas. Whether or not --

MR. BRANCH: We are dealing with Franciscan coastal belt bedrock, correct, both at Elk Prairie and in the report?

MR. SCALMANINI: That is correct.

MR. BRANCH: You state in your written testimony that the hydraulic conductivity of Franciscan graywacke is much lower than the alluvium under Elk Prairie; is that correct?

MR. SCALMANINI: Can you tell me where that I said that, just to be sure?

MR. BRANCH: In the interest of time we will skip that question for now.

In your professional opinion -- is it is your professional opinion in the hydraulic conductivity of the Franciscan graywacke bedrock is derived from the fractures and second permeability rather than the primary porosity of the sandstone?

MR. SCALMANINI: That may be a question better for Mr. Phillips to answer than myself.

MR. PHILLIPS: Could you repeat that question, please?

MR. BRANCH: Sure. Is it your professional opinion that the hydraulic conductivity of the Franciscan graywacke

is derived from the fractures, a secondary permeability, rather than a primary porosity of sandstone?

MR. PHILLIPS: It is my opinion that the Franciscan sandstone has no observable or documented primary permeability.

MR. BRANCH: So in your professional opinion that the porosity of the Franciscan graywacke is also derived from the secondary fractures?

MR. PHILLIPS: From structural complications that include fractures as well as fault zones, yes.

MR. BRANCH: Would I be correct in saying that you find that there is water storage in graywacke?

MR. SCALMANINI: Yes.

MR. BRANCH: Describe how this water would flow into the neighboring alluvium. Is it through fractures?

MR. SCALMANINI: Discharge from fractures or other secondary porosity to under the, call it, the head difference from elevated head in the Franciscan to the lower head in the alluvium and then discharged or seeped into that as a subsurface flow.

MR. BRANCH: Is it your opinion that the hydraulic conductivity is less important than the amount of water stored in determining the amount of water delivered from the bedrock fractures to the channel alluvium?

MR. SCALMANINI: Less important? You better say that

one more time.

MR. BRANCH: Is it your opinion that the hydraulic conductivity is less important than the amount of water stored in determining the amount of water delivered from the bedrock fractures to the channel alluvium?

MR. SCALMANINI: No. They're equally important. The amount of water stored would affect the head or elevation of water in the Franciscan, and the hydraulic conductivity would, I'll say, dictate or govern the rate at which water can discharge from the -- fundamentally the flow in systems like that is governed by laws that have to do with the elevation difference between two points. Basically water flows from high head to low head.

Secondly, hydraulic conductivity, and certainly in a cross sectional area through which flows can take place. All three components, you only mentioned two, have, I'll call it, equal importance in governing the rate at which water will flow from one formation to another.

MR. BRANCH: Darcy's Law generally calculates hydraulic conductivity. Would that be a correct statement?

MR. SCALMANINI: Darcy Law can be used to determine hydraulic conductivity, but in its most common form it is used to calculate flow rate and uses hydraulic for as one of the input parameters, as I just said.

MR. BRANCH: Would it be appropriate to use some form of Darcy's Law to calculate the amount of water being delivered from the bedrock to the alluvium?

MR. SCALMANINI: Yes.

MR. BRANCH: Can you explain how water stored in bedrock is accounted for in Darcy's Law?

MR. SCALMANINI: Well, you don't use the storage, per se, but as I said a minute ago, the amount of water stored in a formation, in an earthen formation is indicated by the water level to which water rises in that formation. And ultimately when looking at flow, using Darcy's Law in your case, one needs to have a gradient for flow. And a gradient is defined as the difference in head from high to low over some distance. And so storage would define in this case the head at the high end in the Franciscan formation, and the head at the low side, which would be in the alluvium in this case, would be the head at the other side, and then the gradient would be over whatever distance one wanted to analyze the flow.

MR. BRANCH: Is water rapidly available for discharge from the bedrock?

MR. SCALMANINI: Define "rapidly."

MR. BRANCH: Do you have any estimate as to the amount that water moves each day through the channel of alluvium into Elk Prairie versus the amount delivered from bedrock?

MR. LILLY: I'm going to object to that question. When he talks about in flow in the channel alluvium, it is not clear where he is talking about. I think that is very important for this hearing.

I object to the question as vague and ambiguous.

CHAIRMAN BAGGETT: Sustained. Restate the question.

MR. BRANCH: I am going is skip that question. Actually, I'm going to move on to Mr. Cawood now.

You took flow measurements along the North Fork Gualala. You had a measuring point EP-1 and EP-2. Where along the North Fork Gualala between those two points did the .9 cfs enter?

MR. CAWOOD: The increases in flow were not visible increases in flow; that is you couldn't see creeks coming in. You couldn't see water. If we did, we deducted them. If you do have NGWC-4 in front of you, the first measurement we made at point A was 4.4. Then Robinson Creek came in. We don't want to count the visible flows, so deducted that one out. So all of these are invisible flows.

MR. BRANCH: Mr. Phillips, you state in your written testimony that portions of the Franciscan bedrock contain aquifers, correct?

MR. PHILLIPS: Yes.

MR. BRANCH: Please tell me where any aquifers are located in the area of Elk Prairie.

MR. PHILLIPS: It's in my testimony, well, as just a general statement. It is my opinion that specifically on the plates that were already produced here shown as the spring locations, one through seven I think it was, spring seven is an indication of drainage from groundwater aquifer that is located within the fault zone on the hillside to the north of the Elk Prairie drainage area.

MR. BRANCH: Have you specifically identified an aquifer on the area of Elk Prairie?

MR. PHILLIPS: The entire mass of fractured rock in the Elk Prairie area contains fractures. Those fractures, it is my opinion, do recharge through precipitation on a yearly basis. So, therefore, the entire mass of the fracture rocked in itself is an aquifer.

MR. SCALMANINI: As a compliment to that, the definition --

MR. BRANCH: Actually, I think my question was for Mr. Phillips.

MR. LILLY: Excuse me, I believe the whole purpose of a panel presentation is that if someone else with expertise in the area has something to add to a question, they are supposed to be allowed to do so.

CHAIRMAN BAGGETT: I would overrule.

MR. BRANCH: Would it be fair to say that individuals you hire, Mr. Phillips, need to seek out aquifers in

Franciscan bedrock?

MR. PHILLIPS: I'm a licensed geologist in the state of California. I provide geologic consultation for anyone who would like my service, yes.

MR. BRANCH: Would it be fair to say your services are necessary because aquifers in the Franciscan bedrock don't occur with great regularity? In other words, people can't just drop a well anywhere they want in Franciscan bedrock and expect to come up with a producing water well?

MR. PHILLIPS: That is correct.

MR. BRANCH: So, in your opinion it is entirely possible that you could find an aquifer in Elk Prairie, right?

MR. PHILLIPS: It is my opinion that there are several occasions that wells could be drilled, yes.

MR. BRANCH: It is also entirely possible with further investigation that you won't find an aquifer in Elk Prairie?

MR. PHILLIPS: It is my opinion that is not a possibility.

MR. BRANCH: Could you explain?

MR. PHILLIPS: I have had the opportunity to traverse an area, let's say, within a two-mile radius of the Elk Prairie wells. I have conservatively estimated that I have traversed over 60 miles of ground in that area. Based on my experience, it is my opinion that aquifers exist and wells

could be drilled to produce water.

MR. BRANCH: You can't say with absolute certainty at this point, can you?

MR. PHILLIPS: There are no guarantees, question.

MR. BRANCH: I have no further questions.

CHAIRMAN BAGGETT: Thank you.

Mr. Lucey, do you have any questions?

MR. LUCEY: I'm not a hydrological engineer, so I could not comment on any of the items. All I can say is that the water has been reduced.

CHAIRMAN BAGGETT: You will get a chance for your comments in a minute.

Pete.

---oOo---

CROSS-EXAMINATION OF NORTH GUALALA WATER COMPANY

BY BOARD

MEMBER SILVA: I want to clarify which wells we are talking about. I'm assuming that PE on the map there, the two wells that are in question.

MR. SCALMANINI: The water supply wells are labeled PW for production Wells 4 and 5. Four was constructed in 1989 as the original well at that location, and 5 was constructed in 1996, late '96 or '7. I have to look, as part of the investigation that I described.

MEMBER SILVA: Going back to the figure, that one

where you show the cone of depression, I think it is 16 and 17.

MR. SCALMANINI: Yes.

MEMBER SILVA: You mentioned that the normal operations, that they pump about ten minutes every hour?

MR. SCALMANINI: That's correct.

MEMBER SILVA: Twenty-four/seven?

MR. SCALMANINI: Not 24/7.

MEMBER SILVA: During the day, then?

MR. SCALMANINI: Well, literally the water system works in such a way that water levels in tanks, you know, automatically call for wells to start and stop. And so it turns out that given the water demands in town, which is logically more in the daytime than at night, calls for water a little more frequently than what it is, say, at 3:00 in the morning. But fundamentally there is a call for a well, as it works out, in about a ten-minute cycle the pumping capacity of Elk Prairie than boosted to town through a long pipeline system and tops the tank up, and then the well goes back off. That is what I meant by ten minutes on and 50 minutes off, basically on average today.

MEMBER SILVA: The worst case, could that happen now? You had a worst case in Figure 17.

MR. SCALMANINI: No. Don't confuse Figure 16 and 17 with best and worst case. They are schematically

illustrative of the conditions that you want to try to achieve, which is Figure 16, to avoid inducing water to come out of the stream, or conversely what you want to try to avoid, which is Figure 17.

It so happens that the cone of depression that forms around a pumped well is dictated by the characteristics of the formation in which the well is completed, its hydraulic conductivity and storage and pumping time. And how far out that cone goes is dictated by those factors. And then the pumping capacity makes it get deeper or shallower. In this case the pumping capacity is fixed by the size of the pump that is installed in the well.

The objective here is to pump at a short enough duration to achieve the figure that is shown in 16, where the cone of depression does not go out and intercept river water and not operate in such a way as illustrated in Figure 17 which would push the cone of depression out to the river and induce water to come out of it. What I've described with the scenarios that I've briefly referred to in my oral testimony and my written testimony this morning and explained in more detail in our report, which is Exhibit 8, I think it is, is that you could pump out there in such a way to induce water to come out of the river. But there is a multitude of ways that you could pump to not induce water to come out of river.

Basically, what I said was in the group that we put together, 16 different scenarios, four of them would look like Figure 17. That is unacceptable. Twelve of them would look like Figure 16, and that would be acceptable to not be converting water from the river by pumping of a well.

MEMBER SILVA: Thank you.

CHAIRMAN BAGGETT: Any questions?

I have a couple, and Barbara and Paul have a couple.

Figure 12 was the picture of the spring?

MR. SCALMANINI: The photograph?

CHAIRMAN BAGGETT: Photograph. There is nothing in your testimony regarding the size or the seasonality or what year that I could find. Is that true?

MR. SCALMANINI: That is true.

CHAIRMAN BAGGETT: I assume the exhibit is not intended for the truth of the matter, if you will, but is an illustrative picture to deal with -- to illustrate there is hydrostatic flow? Is that what I heard you say?

MR. SCALMANINI: Well, can we take the word "hydrostatic" out of that for just a second?

CHAIRMAN BAGGETT: Okay.

MR. SCALMANINI: This is going to sound a little bit like story telling, but I think it needs to be told.

CHAIRMAN BAGGETT: I am trying to understand.

MR. SCALMANINI: I think it is critical. When I first went out there, you stand at the bank of Elk Prairie you can see groundwater discharging into the river, plain and simple. You can see it in April, and you can see it in September. When it hasn't rained for six to eight months.

And so the fundamental question, particularly as regards the question that is in this room, is where is the water coming from? And some would logically say and I think have said that it is coming from upstream. But when you see a groundwater basin discharging to the river, then if you say it is coming from upstream, then fundamentally what you are sort of saying is the river is recharging itself at a higher rate by flowing through porous media under ground. It can't do that. It would rather flow in the surface water course.

So a large part of this investigation was focused on where is that water coming from. As far as I'm concerned, it all comes down to one thing and one thing only: What is the direction of the flow? Everything else is pretty cut and dry. In going through the options for flow, if the river can't recharge itself at a higher rate coming from upstream, than it is either coming from the depletion of groundwater storage or from the bedrock. And some people would argue that bedrock is low permeability, has no yield,

et cetera, et cetera. So the only purpose in putting these in was not to try to quantify the fact that they're big springs or small springs, but to show that water will physically come out of the formation, and translating that to the location of Elk Prairie says that there is very logically enough water in storage and potential discharge from that formation into alluvium to support nominally a one cfs or about a one cfs increase in flow as the water then moves across Elk Prairie continuously through the summertime, fall, et cetera, and discharges into the river. That is the only purpose of the photograph. It is not to try to get quantitative. Sorry for the long-winded --

CHAIRMAN BAGGETT: I understand. That is fine. That is why I asked the question, to clarify that.

On Figure 11 you've got the well -- the subsequent ones you're dealing with, the cone of depression and direction of underflow. You've got SG-1, which I recall from having been there is the small -- the small well that has now been abandoned right next to the river?

MR. SCALMANINI: It hasn't been abandoned.

CHAIRMAN BAGGETT: Used as a monitoring well?

MR. SCALMANINI: There were wells. When you were there, we took you to every monitoring well, which had little locked covers on them and a small diameter pipe inside that goes down in the ground. And at the river it is

basically a place where we can measure the stage of the river itself. So the SG is for staff gauge, which hasn't been abandoned.

CHAIRMAN BAGGETT: I understand. So you have no wells to the south of the river?

MR. SCALMANINI: That is correct.

CHAIRMAN BAGGETT: You don't have any idea whether this gradient cuts underneath the river channel?

MR. SCALMANINI: No. Common sense says that it probably extends across, but ultimately when we drew in Figure 6, you will see a boundary around all of these measurement points with the exception of one of the stream gauges, which is slightly outside North Gualala's property. But all the rest of the investigation was confined to property that they, I think, owned or at least controlled. And so all of the monitoring facilities, whether it be monitoring wells or production wells were put on their property. We didn't go onto other property on the other side of the river to further investigate that.

CHAIRMAN BAGGETT: Your opinion would be that it is likely to continue across, underneath the channel?

MR. SCALMANINI: When you look at the contours, you ask yourself how would they abruptly change at that location. Logic says there would be some continuation of groundwater flow. There is some discharge to the river and some

continuation of flow across.

CHAIRMAN BAGGETT: How do you determine on Figure 17 as your cone of depression and you had overdraft or overpumping, what are you using to determine when that -- when you reach the overpumping portion? You've testified that the wells, I guess, are triggered to demand and supply if the tanks are empty to cause the well to kick on, to pump in the well, to activate. So how do you determine --

MR. SCALMANINI: How do you determine the relationship?

CHAIRMAN BAGGETT: How do you determine in the field in reality when to -- how do those pumps determine there is demand, demand is going to want to trigger the -- what is going to stop that from triggering?

MR. SCALMANINI: We didn't make a projection of it, quite frankly, by accident. But there is a last figure to my testimony, Figure 18, in the paper copies, which shows at first glance what looks very much like Figure 6 that I had up there a minute ago, which was the location of all the existing production wells and monitoring wells.

In Figure 18 you'll see a couple of other locations labeled PWB 6 and 7. Those would be prospective, future production wells. They don't exist today. You will see additional monitoring well sites, six and seven for example, that are added to what is there today.

The Figure 16 that you asked about is an undesirable

condition. What controls against that --

MR. LILLY: Seventeen.

MR. SCALMANINI: Seventeen, seventeen, sorry.

CHAIRMAN BAGGETT: Seventeen.

MR. SCALMANINI: And when we develop the scenarios that I described, which are discussed in some detail in our report which is Exhibit 8, we used a model that used the characteristics of the formation that were derived from the aquifer testing that I described as part of this testimony, to examine how pumping different of those wells, existing wells, called hypothetical for right now, at different capacities for different durations, we could meet the demands that are projected to occur at the town of Gualala. In laying out this well field we also put these other, what I'll call hypothetical monitoring wells in to compliment those that are already there.

The ultimate answer to your question is that you would monitor, probably with some type of electronic-type, what I'll call a transducer, that would record water levels, and in effect control whether or not pumps could start and stop as a function of whether or not the water levels, I'll say, on the river side of the system were sufficiently high to not cause that -- to not observe that kind of reversal. We are confident from our knowledge of the aquifer characteristics that it can be done. It is basically a

matter of showing that to be the case on an ongoing basis. You can -- if you put it into the control circuitry, whether a pump can start or stop if you want to.

CHAIRMAN BAGGETT: Is that your recommendation to develop such?

MR. SCALMANINI: Yes.

CHAIRMAN BAGGETT: Barbara, do you have any?

---oOo---

CROSS-EXAMINATION OF NORTH GUALALA WATER COMPANY

BY STAFF

MS. LEIDIGH: I have a few.

Mr. Scalmanini, on your Figure 2 I notice that two of your cross-sections are straight and one of them angles at the river, cross section AA.

Why is that not a straight line?

MR. SCALMANINI: I don't remember for absolute sure, but I think it was to tie into the geophysical exploration which was conducted across the river in that location. Remember, I said that before we drilled any of the bore holes out there, there was just the one well, production Well 4, which was put in back in '89. There was a geophysical, surface geophysical, exploration effort that identified what the surface geophysics, what the probable shape of the underground looked like, where it went from, let's say, relatively undissolving in materials the alluvium

to the consolidated materials of the Franciscan formation. And I would have to take a chunk of time to say for sure, 'cause my recollection is that we aligned the cross-sections which were drawn based largely on the drilling and the logging of the holes that were put in on North Gualala's property, with some attempt to tie in to where the surface geophysicist ran his so-called strings across the river. That type of work was done off the property. There was some geophysical exploration across the river. That is my recollection.

MS. LEIDIGH: That is your recollection, then.

In your opinion is there any water in the alluvium under the stream that is flowing in the same direction as the river?

MR. LILLY: I have -- sorry, have to object. In the stream, we've got about, according to testimony, a hundred miles of stream. I think the question needs to be specific as to whether they are talking about the Elk Prairie or some other location of the watershed.

MS. LEIDIGH: Let's take Elk Prairie first. Can you answer the question?

MR. SCALMANINI: Can you say it one more time, please?

MS. LEIDIGH: Is there any water in the alluvium under the river in the Elk Prairie area that is flowing in the same direction as the river?

MR. SCALMANINI: Ever, at any time?

MS. LEIDIGH: Generally, but also at any time.

MR. SCALMANINI: Generally, no. The gradients that we had up here on the screen and are included as Figures 7, 8 and 9 show along with the contours of equal groundwater elevation that are derived from those show that the predominant direction of groundwater flow is, let's just say, closer to perpendicular to the river than it is parallel to the river under basically all conditions.

Now as one goes upstream toward the east end of Elk Prairie, the angle relative to the stream is not as close to perpendicular as it is to west end. So, strictly speaking, there is, call it, a small component of flow that would be closer to the stream direction than it would be to the perpendicular direction. To satisfy the conservation of mass can't -- water can't just come and disappear, appear and disappear, then, strictly speaking particularly when the stream stage is high, the answer is probably yes, but generally no.

MS. LEIDIGH: If it flows under the river and keeps going south, where would it go to?

MR. SCALMANINI: I haven't done anything to investigate that. I don't know.

MS. LEIDIGH: Upstream from Elk Prairie to the east, in other words, is there water that is flowing in the same

direction as the stream that is in the alluvium under the river, say, half a mile east, a mile east?

MR. SCALMANINI: Well, again going back to all the observations and Mr. Cawood's gaging, et cetera, and the fact that this is, I'll call it, a perennial stream, there is a component of groundwater that discharges to the stream throughout the watershed. It is in other testimony. We have chosen to focus on the Elk Prairie. As far as I know, what counts is what is the occurrence of groundwater at that location, not what is the occurrence of it a mile, two miles, three miles to the east, west, or any other direction.

But that said, there is a groundwater discharge from, I think, predominantly the Franciscan formation as one goes up the watershed that supports that base flow. Then when one looks at how does water get from the groundwater into a gaining reach of the stream, there are very definable contours. In this case they are not, quote, specifically definable because nobody has gone out to measure groundwater levels around the stream out there.

Fundamentally, the shape of the contours has to be such that flow would come out of the bedrock into the, I'll call it, the streambed materials, basically still some, quote, alluvium, but it gets pretty thin as one goes to the east, and it gets pretty narrow as one goes to the east.

And then there is probably some flow in the alluvium associated with the streambed to the east that is in the same direction. That is not the case at Elk Prairie, but it probably is the case to the east. It hasn't been investigate. Common sense on how groundwater flows and discharges to a gaining reach of stream would suggest that that is the case.

MS. LEIDIGH: Have you done any measurement or do you have any information that would show whether water continues to flow either on the surface or subsurface from upstream of the Elk Prairie during the driest part of the summer?

MR. SCALMANINI: That's better for you -- I'm trying to -- are you talking about surface flows or groundwater discharges?

MS. LEIDIGH: Either one, either water in the alluvium or water on the surface of the river.

MR. SCALMANINI: Go back to what I said a few minutes ago. The river, North Fork Gualala River, is for practical purposes a perennial stream. It stops raining in April, plus or minus, every year. And so if it is a perennial stream upstream for tens to hundreds of miles of tributaries of the mainstream itself, then there is some type of a discharge, in this case, from groundwater that is supporting that base flow. Their measurements of that are not on a regular basis. The most notable are the measurements that

Mr. Cawood -- that are included in his testimony, which were done in September, I think. In other words, about the driest month of the year in that particular setting.

MS. LEIDIGH: As I recall those measurements that Mr. Cawood did did not go very far up. I think they were just in the Elk Prairie area. Isn't that right?

MR. CAWOOD: The point A, the first one, is above Hoodoo Creek. So it is quite a ways upstream.

MS. LEIDIGH: How far?

MR. CAWOOD: I don't -- I do know what the miles are. I have it as 6.9 miles from Highway 1. That is -- wait a second. Two miles, say, is the Green Bridge, three miles. So that would be seven minus three, it's about four miles above the Elk Prairie area. That would be road miles, which is similar to river miles. That is quite a ways upstream.

MS. LEIDIGH: That helps.

Mr. Phillips, you talked about the fractured bedrock and flowing into the river or into the alluvium under the river. You said it is flowing in north to south generally.

Do you have any theories or knowledge as to where that water flows from to reach that area at Elk Prairie?

MR. PHILLIPS: Well, my testimony would be that the groundwater accumulates from precipitation, rainfall,

saturating the hillsides infiltrating the soil and fractured rock, accumulating in the structures within the hillsides adjacent to the drainages. Laws of gravity, they then through time, throughout the summer when there is no precipitation, they would naturally drain out down gradient. And if you have a stream that is tending to travel east and west and you have a ridge that is generally east and west, the drainage would be either to the north or to the south, south to the edges of the ridges where they would occur.

MS. LEIDIGH: Is it possible that there is another stream somewhere to the north that could be coming from?

MR. PHILLIPS: No. As far as topographic configuration and so on? The surface drainage features essentially all drain downhill, and they are all contained within topographic depressions that have hillside conditions adjacent to them, and the groundwater contained within the fractured rock and the faults that cut through the hillsides are draining down through the years to the adjacent drainages.

MS. LEIDIGH: I think that is all I have.

CHAIRMAN BAGGETT: Paul.

MR. MURPHEY: Yes, I have a question for Mr. Scalmanini.

During your investigation, did you conduct any aquifer test in well streams solely in the Franciscan formation?

MR. SCALMANINI: No.

MR. MURPHEY: You don't have any data regarding aquifer characteristics for the Franciscan in the Elk Prairie area?

MR. SCALMANINI: That is correct. There are no wells in the Franciscan formation in the vicinity of Elk Prairie that I am aware of.

MR. MURPHEY: Those are the only questions I have. Thanks.

CHAIRMAN BAGGETT: Do you have any redirect?

MR. LILLY: No redirect.

Thank you.

MR. LUCEY: Mr. Chairman, I have one for Mr. Scalmanini in response to your questioning.

CHAIRMAN BAGGETT: You can't respond to mine.

MR. LUCEY: I can't redirect?

CHAIRMAN BAGGETT: No. There is only recross, if counsel decides, and he's waived his redirect, so there is no recross.

With that, we have time for Fish and Game before lunch.

MR. BRANCH: We need some time to set up. We have a Power Point.

CHAIRMAN BAGGETT: Let's take a seven-minute recess, and then we will do Fish and Game's opening and case in chief and then break for lunch.

(Break taken.)

CHAIRMAN BAGGETT: Back on the record.

We are with Fish and Game's case in chief. Opening statement, Mr. Branch.

MR. BRANCH: Thank you, Chairman Baggett and Members Silva and Carlton.

Department of Fish and Game has an interest in this hearing based not only upon its status as trustee agency for fish and in California, but also on the original and current inclusion of fishery protective flow terms in Permit 14853 which was originally included as Department protest dismissal terms. And the Department is somewhat concerned that the outcome of this hearing may result in cancellation of that permit, and thus the cancellation of those fishery protective flows. We believe this permit needs to remain in effect for the benefit of the fishery and the river.

Although the department, as you are aware, has supported an impact-based groundwater jurisdiction test, our case is based on the four part Garrapata test established by the Board in Decision 1639 for two reasons. First, the Department is well aware that the Board will not be adopting Sax's recommendations. And second, because as far as we know the Garrapata test is the only other precedent on point to be used.

North Gualala Water Company seemed to indicate that

they were also using the Garrapata test and basically believed that most of the elements of the subterranean stream in known and definite channels existed, with the exception of the source of the groundwater. And our witness will be presenting his own opinion as to that.

Basically, I think there is one idea to keep in mind with this case and that is you know it when you see it. Look carefully at the evidence that the Department will present to you and see that this is a clear case of jurisdictional groundwater.

I also have a couple of policy statements to make. The direct testimony of North Gualala Water Company seemed to indicate that they would be able to manage their pumping so as not to induce water from the river to the wells. And their direct testimony also indicated that future well production may rise by two or three times current production. However, if North Gualala Water Company prevails and the Board has no jurisdiction in this case, North Gualala would not be required by the Board to manage its pumping or limit it to a two- or threefold increase. Theoretically they could pump at a tenfold increase, thus possibly inducing large amounts of water from the river.

With that I would like to call our witness, Kit Custis, to testify.

---oOo---

DIRECT EXAMINATION OF DEPARTMENT OF FISH AND GAME

BY MR. BRANCH

MR. BRANCH: Morning, Mr. Custis.

Would you please state and spell your name for the record.

MR. CUSTIS: My name is Kit Custis, C-u-s-t-i-s.

MR. BRANCH: And DFG Exhibits 1 through currently 23, is that a true and correct representation of your testimony and supporting exhibits?

MR. CUSTIS: Yes, it is.

MR. BRANCH: Are there any corrections that need to be made?

MR. CUSTIS: There is one correction on the last page on exhibit --

MR. BRANCH: Is it DFG Exhibit 14?

MR. CUSTIS: It is 14, Luhdorff & Scalmanini's experts from their report. The last page should actually be a separate exhibit. I created that exhibit and not Luhdorff & Scalmanini, so we need to number it Exhibit 24.

MR. BRANCH: Would it be possible to renumber the Exhibit 24?

MR. CUSTIS: You need a title for it?

MR. BRANCH: Why don't you give a brief description of what it is.

MR. CUSTIS: It is just estimates of the depth of

alluvium in North Fork Gualala based on projection of adjacent bedrock slopes.

MR. BRANCH: Can you just please, as briefly as possible, state your qualifications.

MR. CUSTIS: I am currently a senior engineering geologist with the Department of Conservation's California Geological Survey. We used to be known as the Division of Mines and Geology. We recently changed our name. I have a Master's and Bachelor's degree in geology. I've got 55 plus units at U.C. Davis in hydrological sciences, graduate study. I'm a registered California geologist, certified engineering geologist and a certified hydrogeologist in California. I have worked for over 23 years as a professional geologist, both in government and private practice, including work for the State Board and the Central Valley Regional Board.

MR. BRANCH: Do you have any specialized experience working in the Gualala River watershed?

MR. CUSTIS: My current job is to work on what we call the North Coast Watershed Assessment Program, which is a joint effort by the resources agency and North Coast Regional Water Quality Control Board. My assignment for that is to prepare the alluvial and hydrology studies of watersheds in the North Coast, in particular I have worked on the Gualala watershed for the last year and a half.

MR. BRANCH: Mr. Custis, could you please give a brief description of the Gualala River watershed?

MR. CUSTIS: With this I would like to start the Power Point. This is the DFG Exhibit 4, North Fork Gualala, USGS 1 to 24,000 streams. Basically outlines the drainage basin for the North Fork Gualala. And the area that is in red is -- streams in red are those that drain to Elk Prairie. In the lower --

MR. BRANCH: Sorry to interrupt. Could you state what the source of this is?

MR. CUSTIS: The source of this is arc info map generated by GIS. We get the data from -- actually get it from CDF who gets it from USGS.

In the lower right-hand corner is a statistic that you can generate, asking how much drain miles are there in the basin. And basically for the parts that are highlighted in red it says about 112 miles. If you take off a couple miles, 1.8 miles downstream of Elk Prairie, you end up with 110 miles, which is what I used in my testimony later on.

This is DFG Exhibit 9. This is the most recent geologic landslide map that we are preparing for the North Coast Watershed Assessment Program. This is a plate, the northern plate of three plates. The same map is over across the room. It's a little easier to see for the Board. What is important here is the Elk Prairie is identified the main

structure for the geologic structure for the watershed is the San Andreas Fault, which runs diagonally north of west to southeast, and this yellow, light yellow, meandering channel is the alluvial, aquifer alluvial system in North Fork Gualala.

Now I've stopped mapping. This is the part of the map that I mapped the alluvium. I stopped mapping of this area, about eight miles upstream of Elk Prairie because of the scale. The alluvium runs all through this basin in all the active channels.

There is approximately 2,500 -- 25,400 acres draining to Elk Prairie and the average rainfall is about 43 inches per year. That's a general statement.

MR. BRANCH: Let me cut to the chase. In your professional opinion do you believe a subterranean channel is present at Elk Prairie?

MR. CUSTIS: Yes, I do.

MR. BRANCH: Can you briefly explain how you came to this conclusion?

MR. CUSTIS: As I showed on this map, the drainage system in North Fork as incised into the Franciscan bedrock, I think we will all agree on that. This is a close-up of the Elk Prairie taken from map DFG's 9A, showing alluvium and the like in Elk Prairie River, the North Fork River as it runs through Elk Prairie. Also on this map are some

landslides as part of our project, and these red lines are locations of cross-sections that I used to estimate the depth of alluvium. That is Exhibit 24, where those three cross-sections are located.

How did the North Fork Gualala, as well as all the other Gualala water streams get incised. Basically over the last, at least the last 300,000 years you've had fluctuation in sea level, which as the sea level drops causes incision in the bedrock tectonic. I think of particular importance to the current discussion is that about 18,000 years ago we had a low standing sea level, about 120 meters. This is coming from our DFG Exhibit 11 which is Grove & Niemi, 1999, B3. So this incision and the subsequent backfilling over the last 15,000 years is what has incised and created the sediments in the alluvial channel.

This is just to show where -- DFG Exhibit 15, Bailey 1999, I think, '96, excuse me. And Sheet No. 1, just showing what Bailey's geophysical cross section, which is the next is located in Elk Prairie. This is his cross section from geophysical data, three units. The alluvium or weathered bedrock unit and the lower one is fresh rock which is the most important unit in this cross section to discuss. This is DFG Exhibit 15. Is Bailey again, 1996, with a cross section AA. It's a close-up of the descriptions, typically in fresh rock is slightly weathered,

described as slightly weathered, well fractured Franciscan sandstone with an occasional well-weathered clay zone. Fractures are very tight, which is significant, and gives the size and velocity to 11,500 feet per second.

We have seen this before. This is DFG Exhibit 14, Luhdorff & Scalmanini's 1998 Figure 2-2 cross section AA. And similarly what is important here is the sediment in the valley is sand and gravels, also notice that this clay layer that is north of North Fork Gualala seems to deepen as it goes to the north.

Similar in DFG 14, Luhdorff & Scalmanini, 1998, geologic cross section. This is drawn through Pumping Well 4, very similar to cross section AA and a similar increase in clay thickness as you go to the north.

And finally this is DFG Exhibit 24, trying to estimate how much alluvium might be in the North Fork Gualala. We did -- initially, as part of our study, we did a cross section at Elk Prairie and estimated, read it here, about 180 feet depth just by projecting the slopes down. And the Scalmanini report estimates somewhere between 175 to 178. The statement is 170. You read the cross section, it may be 175 but that is it. And if you use the same methodology you get continued deep sections of alluvium as you go to the north up to 85 feet where that last cross section was.

MR. BRANCH: Your opinion is there is groundwater

flowing in the subterranean channel?

MR. CUSTIS: The answer is yes. I think most parties will all agree that there is groundwater flowing in the subsurface of Elk Prairie. There is some -- this is DFG Exhibit 14. It is Luhdorff & Scalmanini, 1998, a close-up of the monitoring well locations from their Figure 4-1. What's important here is that -- to me is that north or east of the well field is a large meander. As you will see in my written testimony, I have a photograph of 1936 of this area. Shows that this meander here is a point bar. It's gravel; it's not a floodplain deposit. And I believe that groundwater flow actually has potential -- the source of it actually is recharge up in this area, and it will flow down through the Elk Prairie.

This is DFG 14. Again, it's Luhdorff & Scalmanini 1998, Figure 4-5. It shows, we've seen this before, it shows the groundwater flow, low flow conditions flowing essentially from northeast to southwest, and I have added on here the depths to the top of the sand and gravel alluvium.

MR. BRANCH: Where does that data come from?

MR. CUSTIS: That data comes from the well logs, Scalmanini's Exhibit 14. And also from the cross-sections. That is what I pointed out earlier. You can see that increase in depth. Essentially, the depth at Well 5 is the shallowest and it increases to the north and to the

northwest. And if you contoured this, you would find that there is actually sort of a confining cap on this from the clay layer.

MR. BRANCH: In your opinion, are the bed and banks of the channel relatively impermeable in comparison to the alluvium?

MR. CUSTIS: Yeah. We all agree that the alluvium is permeable. I don't think there is any disagreement on that. The bedrock, I think we agree it has a low permeability. And what I did was look at different ratios of specific capacity, ratio of transmissivity and the ratio of the hydraulic conductivity. The end result of that is I estimate their alluvium is about two and a half to three orders of magnitude more permeable than the bedrock in the Franciscan coastal bedrock, in the general. We have no studies at the site.

Just for brevity, these are -- how I got these calculations for specific capacity, the data comes from -- alluvium comes from Luhdorff & Scalmanini, Exhibit 14, Pages 11 and 12. I used their pump test information, specific capacity of pumps is on the average of about 110 gallons per minute for drawdown. The bedrock I took from Fish and Game Exhibit 6, Table 6, which is the Parfitt & Germain report, and DFG Exhibit 16, which is the Ford report, taking the average of their specific capacities for the Franciscan.

You eventually go through the math and you come up with a, taking the law with the difference, come up with a 2.66 increase or ratio for alluvium to bedrock. Transmissivity similarly. Taking Luhdorff & Scalmanini's pump test data from Exhibit 14, Table 5-1, an average value for transmissivity of 370,500 gallons per minute. Bedrock I had to calculate from taking an average of DFG Exhibit 6 and DFG Exhibit 7 -- that is the Ford, 17. That is Driscoll's method of calculating transmissivity from specific capacity, coming up with an average around 316. And again doing the math --

MR. BRANCH: This equation that you are using, is this a generally accepted equation for determining transmissivity?

MR. CUSTIS: Yeah. Driscoll's method is a generally accepted equation for calculating a rough estimate of transmissivity from specific capacity.

MR. BRANCH: You end up with a number of three order of magnitude?

MR. CUSTIS: Three times order of magnitude. If you go to hydraulic conductivity, similarly. Alluvium from Luhdorff & Scalmanini report, DFG Exhibit 14, Page 41. Bedrock now -- as part of my study for the North Coast watershed assessment, part of the issue is groundwater and surface water availability. I looked at the well logs that

I could find for bedrock in the whole watershed, Gualala, and in the Franciscan. And you come up with a -- my review of it comes up with a medium transmissivity of approximately 1.7 gallons per minute per foot squared. Dividing that out, you come out with an order of magnitude 3.42 increase in alluvium over bedrock. If you just use -- the problem with using Parfitt and Germain and Ford is that I have no thickness. In transmissivity you need thickness. So if use down here the 60 foot thickness, which is Parfitt's report as sort of being a cutoff between deep and shallow wells, I come up with a ratio 2.78. So it is very similar.

MR. BRANCH: 2.78 or 2.87?

MR. CUSTIS: Excuse me, 2.87.

In my testimony I used the range from two and a half to three, and even though my analysis showed it was more, I didn't use that.

MR. BRANCH: Finally, in your opinion, is the course of the subterranean channel capable of being known by reasonable inference?

MR. CUSTIS: The answer is yes. Given the site-specific studies that we've done, our regional watershed studies, studies by DWR on the groundwater in the area of both Mendocino Coast and Sonoma, I think it is reasonable that there a subsurface channel exists in the North Fork of the Gualala River at Elk Prairie as well as

upstream.

We know from the local conditions that there is course grained alluvium. I've mapped activity stream alluvium on our DFG Exhibit 9 of approximately eight miles upstream. Most of the alluvium is sand and gravel and lies in incised bedrock canyon, has a thickness at Elk Prairie of approximately 170 feet. Groundwater flows in the subsurface generally from the southwest -- towards the southwest to the ocean through this coarse grained alluvium, and the permeability contrast between the subsurface sands and gravels in the Franciscan is at least two and half to three orders of magnitude, alluvium being more permeable.

MR. BRANCH: Finally, you heard earlier, I believe, Mr. Scalmanini testify as to what he believed the source of groundwater in the alluvial channel to be.

What is your opinion as to the possible source of groundwater or sources of groundwater?

MR. CUSTIS: It is my opinion that the likely source of groundwater is from recharge or from flowing water upstream of Elk Prairie, either through just subsurface flow in the subterranean stream that is upstream or through infiltration in the large meander point bar that is just to the east.

I think that the gradients that you see in the monitoring wells are partially due to the fact that I showed the capping clay layer actually cuts off the flow and forces

the subterranean flow to redirect towards the center of the canyon. You also have the San Andreas Fault just downstream of Elk Prairie. In fact, it cuts off the east side of Elk Prairie, which I think probably impounds water, causes water to come to -- groundwater to come to the surface.

If you look at a Cross Section C of Luhdorff & Scalmanini report and compare the elevation of bedrock at Elk Prairie, it's about a hundred -- the depth is about 170 feet. When you get out into Wells 3 or 1, 2, 3 are the deepest wells --

MR. BRANCH: These are monitoring wells?

MR. CUSTIS: These are pumping wells. The one well that they don't use because of water quality issue. The depth to bedrock is about a hundred -- fractured bedrock is about 130 feet, something like that. So you have about 40 foot rise just going across from Elk Prairie to the west. That rise constricts the channel and causes flow to come up to the surface.

MR. BRANCH: I have no further questions. I'll make our witness available for cross.

CHAIRMAN BAGGETT: Mr. Lilly.

MR. LILLY: Mr. Baggett, you had suggested that we have a break. We are pretty close. I can guarantee you that I am going to take more than five minute. So it is up to you if you want to take a break now or if you want me to start.

CHAIRMAN BAGGETT: We will take recess for lunch and come back and cross-examine. We will be back 1:00 sharp, we will start.

MR. LILLY: One matter of housekeeping. I realized I forgot to offer my exhibits into evidence after all the questioning is done. I was supposed to and I just forgot. I wonder if I can just do that now so we can take care of that?

CHAIRMAN BAGGETT: Any objection?

If not, they are so entered.

We will be recessed.

(Luncheon break taken.)

---oOo---

AFTERNOON SESSION

---oOo---

CHAIRMAN BAGGETT: We are back on the record.

We are at cross-examination of Fish and Game witness, Mr. Custis.

Mr. Lilly, you are up.

---oOo---

CROSS-EXAMINATION OF DEPARTMENT OF FISH AND GAME

BY NORTH GUALALA WATER COMPANY

BY MR. LILLY

MR. LILLY: Thank you, Mr. Baggett.

Mr. Custis, as you know from our opening statement and our field trip, my name is Alan Lilly. I represent the North Gualala Water Company. I have some questions for you this afternoon.

Do you have your written testimony in front of you?

MR. CUSTIS: I have a copy of it.

MR. LILLY: Please get that because I am going to ask you several questions about that. Just so the record is clear, when I refer to your testimony, I'm referring to DFG-1. In particular, starting on Page 2 at Line 3, you state through an interagency contract I also regularly provide technical analysis for the Department of Fish and Game on the effects of pumping wells on stream surface flows.

What are the terms of the interagency contract between your department and the Department of Fish and Game?

MR. CUSTIS: Besides the general service boilerplate, which is about 20 pages, the contract specifies that they will provide -- we will provide, like this term, it is senior engineering geology services to Fish and Game, and that is essentially it, and there is discussion about who will pay what expenses and all that.

MR. LILLY: Are there any limits in the contract or should I say -- are there or were there any limits in the contract on your amount of money that the Department of Fish and Game would pay your department for your work in this case?

MR. CUSTIS: Most of those contracts have a specified limit on whole amount.

MR. LILLY: Do you know what the limit was in this contract?

MR. CUSTIS: We actually have three contracts with Fish and Game right now for various -- coming -- Fish and Game wants a contract from each funding source. We used to have a combined contract where we have all three for two years. That became chaos, so they said, okay, we have individuals. I believe the one that is for this contract is $140,000 over -- spendable over two years.

MR. LILLY: That is just for your work on this hearing?

MR. CUSTIS: I'm actually -- the lease -- we have a person named Steve Reynolds who is the primary senior engineering geologist on this contract, and we are also using staff from other -- from timber harvest programs. My work on this has been -- this year has been minor. Prior to coming on the North Coast Watershed, that was my contract primarily. Now I am on other full-funded projects.

MR. LILLY: So you are saying your work in relation to this hearing and the preparation for this hearing was a minor part of 140,000?

MR. CUSTIS: Yeah.

MR. LILLY: I think you mentioned that you had done work on the Gualala River watershed in general in connection with the big map that is an exhibit, DFG Exhibit 9; is that correct?

MR. CUSTIS: That's correct.

MR. LILLY: Was any of that fieldwork that you personally did in the watershed of the North Fork of the Gualala?

MR. CUSTIS: Yes. We looked at North Fork. One of the problems that you have in Gualala is getting access, and the Gualala Redwood Company readily allowed us access. We spent a lot of time up there. I didn't spend as much as the landslide people; that really needs to get up in the headlands.

MR. LILLY: Again, focusing just on the North Gualala, not the entire Gualala watershed, how many days of fieldwork did you personally do in the North Fork of the Gualala River?

MR. CUSTIS: I spent probably five to seven days on the North Fork. We'll go back if the budget permits.

MR. LILLY: What was the main purpose for your work when you did that five to seven days of fieldwork?

MR. CUSTIS: Part of our project, which is not on the map that you see because it is a little bit too complex to display on a map, is a map of fluvial characteristics of all of the streams, all of those blue line streams that were shown across the watershed have been mapped by myself from air photo reconnaissance, both in 1984 and 2000.

So part of the work was twofold; one to field check that interpretation, and the other was we have two new staff people that were hired to be in summer, was to take them out into the field and go through some stream monitoring and stream measurement exercises.

MR. LILLY: Is it fair to say that the majority of your work in the field focused on the blue line streams and mapping those and confirming how they compared with the aerial photography?

MR. CUSTIS: Yes, that is the primary purpose.

MR. LILLY: When you were preparing for this hearing, did you ever discuss anything regarding this hearing with

Mr. Charles NeSmith?

MR. CUSTIS: We had a general meeting because on the -- who was -- because we were supposed to take the lead in this testimony, which we assumed would be secondary in this testimony, there was a question of how detailed I was going to do my evaluation. So we had about an hour-, two-hour meeting on that issue. Just generally talked about the watershed, nothing specific on testimony.

MR. LILLY: But was there coordination as to what you were going to cover versus what he was going to cover?

MR. CUSTIS: No. I mean, other than the Garrapata test, talking about the specific tests are for subterranean stream and getting clarification on that to make sure I covered those issues.

MR. LILLY: That is what you talked about with Mr. NeSmith?

MR. CUSTIS: In general yes.

MR. LILLY: Now if you can move forward to Page 3 of your testimony, particularly starting at Line 11. I'll just read it. It says: Approximately 110 miles (177km) of perennial stream channel exists upstream of the North Fork's confluence with the Little North Fork Gualala, based on 1 to 24,000 U.S. Geologic Survey, (USGS) seven-and-a-half-minute blue line streams (DFG Exhibit 4).

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: I have a question. Can you get out Exhibit 4?

MR. CUSTIS: Will this do, or do you want it on paper?

MR. LILLY: No. If you have it up to the stream and that works for you, that is fine with me. It looks like that's an accurate copy, although I notice in the first entry it looks like you added 111.8 eight miles. That is not in my copy.

Is that something you added later on?

MR. CUSTIS: Must have then added later for the presentation to clarify. In the bottom I said what a kilometer equals, .62 miles.

MR. LILLY: So basically that 179 number was kilometers?

MR. CUSTIS: That is in kilometers. You can see at the top it says, "Statistics for Kilo Length Field." That is the database field. Kilometers.

MR. LILLY: My question is just focusing just on the North Fork Gualala watershed. Are these streams and tributaries and creeks so forth that are depicted in red, are those the blue line streams?

MR. CUSTIS: Yeah. Those are the blue line streams in order to -- Art View wants you to highlight a feature and then you can go into the database side and do a tell me the

statistics or tell me, in this case, give you a mean and variance on all that stuff. You have to highlight the feature, and I set it up so it would show red on those features I highlighted, except for the marine boundary, which is actually watershed boundaries.

MR. LILLY: Is it your testimony that every single one of these little creeks is perennial?

MR. CUSTIS: That is according to the USGS mapping that they have defined those as perennial streams. I believe that is their definition. What I did in the air photo interpretation it seemed to be a reasonable approximation.

MR. LILLY: Did you field check all these streams?

MR. CUSTIS: No.

MR. LILLY: It would be hard to do that in five to seven days, I assume?

MR. CUSTIS: Been hard to do that -- I think there is 1,200 or 1,100 kilometers of stream in the whole watershed, so, yeah, it would be a little difficult. We are supposed to do a million acres a year. This is one of three watersheds, actually one of four watersheds that we were doing.

MR. LILLY: Just going down to the bottom of Page 3 of your testimony in Paragraph 7 you generally state that the South Forth Gualala River watershed is approximately four times the size of the North Fork Gualala River watershed; is

that correct?

MR. CUSTIS: That's correct.

MR. LILLY: Going forward on the next page, Page 4, in Paragraph 8, you state an assumption that the base flows in the North Fork Gualala, therefore, will be approximately one-quarter of the base flows in the South Fork Gualala and that leads to an estimated base flow of approximately ten cfs; is that correct?

MR. CUSTIS: That was correct, yes.

MR. LILLY: Do you have any stream flow data from the North Fork Gualala River to determine how accurate this assumption is?

MR. CUSTIS: As part of the NCWAP program we put in a gauge below the confluence of Little North Fork. I believe one of the exhibits I put it in was last year's data from that. So we have one year's worth of data on the North Fork. I don't think I can bring that up here.

MR. LILLY: I think you described that actually in your testimony, too.

MR. CUSTIS: And essentially -- there it is. What this is showing is we actually put in three gauges. Put in one on the North Fork. And the older gauge that I talked about was downstream of the confluence of what we call Wheatfield and the south, the continuation above Wheatfield is above the South Fork. We now split that so that we can tell

because there is a big watershed, what is coming from both of them. On this I believe the blue is the North Fork discharge last water year.

MR. LILLY: In Paragraph 7 your testimony says that the period of record for this gauge is insufficient to develop a long-term hydrograph; is that correct?

MR. CUSTIS: It is insufficient to calibrate that estimate that I made on ten cfs as the base flow.

MR. LILLY: Do you have any other data to determine how accurate that ten cfs estimate is?

MR. CUSTIS: No. The methodology for doing that is essentially what the water rights group they put on a workshop a few weeks ago talked about how to calculate ungauged stream flows. Essentially they use an area method, so it is approximately what water rights has done. But the calibration is -- we'll have to wait.

MR. LILLY: Particularly for base flows it may not just be proportionally to watershed area because there may be different springs or seeps in one watershed versus the other?

MR. CUSTIS: You would expect that because of precipitation differences, vegetation differences, geology differences, all of these things, an area seems to be one of driving parameters. If you look at some of the USGS coefficients, they usually rely on area.

MR. LILLY: Let's go forward to Paragraph 9 of your testimony and particularly the reference to DFG Exhibit 9, which is the big map. I don't know if you can put that up there on the screen. Otherwise --

MR. CUSTIS: I think.

MR. LILLY: We've got the poster over here so people can look at that as well.

MR. CUSTIS: I think I can. If people want, I can zoom in if there is something you want to see.

MR. LILLY: That's good. Thank you.

One question, I have the San Andreas Fault zone is shown in the lower left-hand corner of this exhibit; is that correct?

MR. CUSTIS: That's correct.

MR. LILLY: How wide is this fault zone?

MR. CUSTIS: I would -- Elk Prairie is about 1,200 feet wide, so is, depending on where you want to take the measurement, it is a little bit wider, so maybe 1,500, 2,000, something like that. Well, I don't think -- because this is a landslide geology, general geology map, and we, as a policy, we have an AP zone group. They get very concerned when we put defined boundaries of the fault on a map, regional map like this. They prefer people go straight to the AP map which is the official state map where the San Andreas Fault lies.

MR. LILLY: That leads to my next question. This map does not have any faults other than the San Andreas Fault zone, it does not show any earthquake faults at all, does it?

MR. CUSTIS: It shows a number of faults. There is Tombs Creek Fault, which is to the east. It should run somewhere along this contact.

MR. LILLY: Is it actually shown as a fault on this map?

MR. CUSTIS: It's probably not. This is one of the three sheets and Tombs Creek Fault is coming up through here. It is part of this contact between those two units, which this is Coastal Belt and other is Melange.

MR. LILLY: Probably should back down to get close to the microphone.

CHAIRMAN BAGGETT: Can we get some description for the record?

MR. LILLY: I was just going to ask you that. When you were saying "this," were you referring to the dark green area on the map that is shown by TK and fs?

MR. CUSTIS: That's correct.

MR. LILLY: Basically, other than that, this particular map that is DFG Exhibit 9 does not show any faults?

MR. CUSTIS: Doesn't look like we put any of the minor faults that are in the watershed, obviously.

MR. LILLY: Then one other question about this map, there's some features that are shown in orange. What are those features?

MR. CUSTIS: It would be the south central part of the map with a QTORC as the map designations. Those are the Olson Ranch formation.

MR. LILLY: Does this map show any Olson Ranch formation in any watershed of the North Fork of the Gualala River?

MR. CUSTIS: Doesn't look like it. No, it is generally confined to the central part, a lot more to the south on the other sheets.

MR. LILLY: Please move forward to Page 6 of your written testimony. I think you clarified this on your direct; I just want to make sure. On line 15 you refer to Page 27 of Exhibit DFG 14. Is that the page that you have now relabeled as Exhibit DFG 24?

MR. CUSTIS: Yes, I think that is the downslope projection of topography.

MR. LILLY: Thank you.

Let's go forward to Page 8 of your testimony. At Lines 11 through 12 you state at Elk Prairie gradient drops in elevation moving generally from east to west.

Do you see that statement?

MR. CUSTIS: Right.

MR. LILLY: Are you referring to the gradient of the stream, the gradient of the land or the gradient of groundwater there?

MR. CUSTIS: I think in that the subject is groundwater elevation data. I think the southwest would flow results and the background water generally flows from high low potential, so it would be the groundwater gradient.

MR. LILLY: Is this statement based on the Figures 4-4 and 4-5 in DFG Exhibit 14?

MR. CUSTIS: I would assume those would be water level contour maps from Luhdorff & Scalmanini.

MR. LILLY: They're what is referred to in about two sentences earlier in that paragraph. I just want to make sure that is the data you relied upon to make that statement about the gradient.

MR. CUSTIS: Yeah.

MR. LILLY: And going forward to Page 9 of your testimony at Lines 19 to 21, there is a sentence which states Parfitt and Germain also found that the average specific capacity of wells in the Coastal Belt Franciscan graywacke was 0.265 gpm per foot with well drawdowns averaging about 68 feet (DFG Exhibit 6, Table 6).

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: How many wells were used to calculate this

average specific capacity in that report?

MR. CUSTIS: I think for the Coastal Belt I recall something like four, four water wells.

MR. LILLY: In fact, there is a footnote in that Table 6 that says four wells were used to do the calculation?

MR. CUSTIS: Yes, that is correct.

MR. LILLY: Where are these four wells located?

MR. CUSTIS: I would have to look in their maps. I'm not sure that they actually identified the location of them. They just said general Coastal Belt Franciscan.

MR. LILLY: Do you know how far they were or how close they were to the Elk Prairie?

MR. CUSTIS: No.

MR. LILLY: Have you read that entire 1982 Parfitt and Germain report?

MR. CUSTIS: I have read it, yeah.

MR. LILLY: Do you have a copy of the entire report with you today?

MR. CUSTIS: Yes.

MR. LILLY: I'm sure that you are aware there was -- part of the report concerned the Point Arena subunit; is that correct?

MR. CUSTIS: Well, I don't know subdivision, but the subarea you mean?

MR. LILLY: I think their term was subunit. You might

just look on Page 70.

MR. CUSTIS: It was the whole Coastal Mendocino, so I would assume that that's correct.

MR. LILLY: I have copies here of Figures 19 and 20 from that report. And I will give you a copy of each of those, and you can compare it to the report just to make sure they are accurate. I think looking at those one shows the aerial geology and the other shows the well locations. I think you can fairly readily determine which wells in the Point Arena subunit were actually in the Franciscan formation. I'd like you to take a minute and do that.

MR. CUSTIS: You have a complete set? Mine are cut up.

MR. LILLY: Mr. Baggett, I've got multiple copies of these. We are going to offer these as exhibits. I am not sure how you want to handle the mechanics of it, but I have the copies here.

CHAIRMAN BAGGETT: It would be useful to have them up here to review.

MR. LILLY: How many copies do you need?

CHAIRMAN BAGGETT: There is five of us up here.

MR. CUSTIS: This whole map is of the subunit.

MR. LILLY: Just for the record, while you are checking, I will ask that Figure 19 be marked as Exhibit NGWC 13 and Figure 20 be marked as NGWC 14.

MR. CUSTIS: It looks like most of the Coastal Belt is on the right-hand side of the figure, running toward -- assume that is Garcia, that is San Andreas Fault.

MR. LILLY: The Coastal Belt Franciscan is what is marked as TKC, right?

MR. CUSTIS: Right.

MR. LILLY: Basically, which is to, if we kind of look at this vertically, is to the right or northeast of the fault lines; is that correct?

MR. CUSTIS: Of the Garcia, which I believe that is the San Andreas, that's an extension of.

MR. LILLY: It looks to me if you then shift over to Exhibit NGWC 14 that the only wells that are in the Franciscan formation shown on this map are basically up near the top of the map, up inland from the Point Arena area; is that correct?

MR. CUSTIS: It looks that way, most would be the southern wells are in the -- I don't know what the township range is, but it is Section 28.

MR. LILLY: That is Section 28 that is basically inland from Point Arena?

MR. CUSTIS: Essentially, yes.

MR. LILLY: Can you tell about how many miles that is from the Elk Prairie?

MR. CUSTIS: These are township ranges are a mile each,

so about 15 miles, something like that. About 11 blocks, but they are diagonally.

MR. LILLY: Roughly 15 miles?

MR. CUSTIS: Yeah.

MR. LILLY: If you can fold those up for a minute and go back to your written testimony, again on Page 9, moving down to Line 22, your testimony states: Ford (DFG Exhibit 16) investigated the occurrence of groundwater in the Sonoma County portion of the Gualala watershed and found similar conditions.

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: Then in the next sentence you state: Ford found that the yields of wells drilled in the Franciscan bedrock generally are low ranging from one gpm with an average specific capacity of 0.22 gpm per foot (DFG Exhibit 16, Pages 147 to 148).

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: Where are the wells that Mr. Ford is referring to in this sentence?

MR. CUSTIS: I would have to pull out the map and see exactly where they are, but they cover the whole Sonoma County area, generally. I have the report if you would like me to --

MR. LILLY: I actually have copied the figure from the report that shows the locations of those wells. I will hand that to you and everyone else as well.

MR. CUSTIS: Okay.

MR. LILLY: So can you tell from looking at this map where the nearest well that was shown in this report that was in the Franciscan is to the Elk Prairie?

MR. CUSTIS: Probably be down by the Russian River, maybe some. I would have to have the regional map to then confirm that. My guess would be down by the Russian River.

MR. LILLY: Is it fair to say at least 25 to 30 miles from Elk Prairie?

MR. CUSTIS: That would be reasonable, 20 to 30 miles.

MR. LILLY: I will ask that this exhibit be labeled as NGWC 15.

Now moving forward to Page 10 of your testimony at Line 3, you said: My review of logs of 17 bedrock -- excuse me. My review of logs for 17 bedrock wells in the Coastal Belt Franciscan of the Gualala watershed found similar results to Ford, Parfitt and Germain (DFG Exhibits 16 and 6 respectively).

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: Where are the wells, these 17 bedrock wells that you are discussing located?

MR. CUSTIS: Would you like me -- I have a spreadsheet for them. Generally, most of them are concentrated down in the Annapolis area, which is southeast of Elk Prairie.

MR. LILLY: So they are not in the North Fork Gualala watershed?

MR. CUSTIS: Not certain if there is -- there may be one in the North Fork or actually in Little North Fork. There was one in that area. I'm not sure if I used it.

MR. LILLY: Do you have those well logs here today?

MR. CUSTIS: I don't have the logs here today. I have a spreadsheet which I used to calculate the logs.

MR. LILLY: You used to calculate the specific capacities?

MR. CUSTIS: Yes. From the transmissivity and hydraulic conductivity.

MR. LILLY: I think you say in your testimony on Line 5 on Page 10 that you calculate an average bedrock specific capacity of 0.21 gpm per foot?

MR. CUSTIS: That's correct.

MR. LILLY: What was the highest specific capacity of any of these 17 wells?

MR. CUSTIS: Can I pull the statistics?

MR. LILLY: Sure.

MR. CUSTIS: Specific capacity of 17 wells, maximum was one gallon per foot per minute in bedrock.

MR. LILLY: That was for one of the 17 wells in the Franciscan bedrock?

MR. CUSTIS: Yes.

MR. LILLY: Now I think just moving forward here on your written testimony at Lines 10 through 11, you state: I also estimated hydraulic conductivity assuming the conversion of specific capacity to transmissivity proposed by Driscoll for the unsaturated case (DFG Exhibit 17, Page 1021).

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: What do you mean by the unsaturated case?

MR. CUSTIS: In Driscoll's, it is one of the exhibits, he's got two coefficients that he used. One is for confined aquifer and one is for unconfined aquifer. That is sort of a misstatement. It should be unconfined.

MR. LILLY: It actually should read for the unconfined case?

MR. CUSTIS: Yes.

MR. LILLY: In fact, these calculations like you've discussed in your testimony that relate a gradient and a transmissivity or hydraulic conductivity to calculated flow, they are for a case where the aquifer is actually saturated, are they not?

MR. CUSTIS: Yes.

MR. LILLY: Then going forward to the next sentence of your testimony, it states: I then assumed the thickness of the bedrock yielding water to be the same as the well screened length.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: What do you mean by "bedrock yielding water"?

MR. CUSTIS: When you use that calculation you have to decide what the thickness is. If you try to go transmissivity to hydraulic conductivity, you have to divide by the thickness. So you've got to decide where water -- what part of the formation is yielding water and I took the screen interval in each well and used that for the thickness rather than the total depth of the well.

MR. LILLY: Is there -- so what you're really talking about is the water yielding bedrock; is that correct?

MR. CUSTIS: It is the bedrock that yields the water to the well, yes.

MR. LILLY: This part of your testimony refers to Exhibit DFG 17 at this page. Do you have that exhibit handy? That is the copy of the page from the Driscoll text.

MR. CUSTIS: I can put it up on the screen.

MR. LILLY: That is fine, either way, as long as you can read it.

My question is: Which formula on this page refers to the thickness of bedrock formation or to the length of the well screen interval?

MR. CUSTIS: It's -- you are calculating transmissivity which is the hydraulic conductivity times thickness. It is apparent in the term transmissivity.

MR. LILLY: So you actually need to use a formula that is not even on this page?

MR. CUSTIS: It is a general formula for groundwater, yeah.

MR. LILLY: And it is not on this page?

MR. CUSTIS: May not be.

MR. LILLY: Going forward to Page 10, Lines 21 to 23, your testimony states: There are several possible means by which recharge could occur, including subsurface flow from the subterranean channel alluvium upstream, recharge from surface water through sand and gravel from the stream channel or combination of both.

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: When you say several, there are only two listed here. Do you mean more than two?

MR. CUSTIS: Several means two or more, isn't it?

MR. LILLY: I will just ask the question: In your opinion are there any other possible means by which recharge

could occur besides the two that are described here?

MR. CUSTIS: I think it is fair to say you can get recharge from a bedrock, but it is a minor amount. And you can get recharge from percolation through the floodplain deposits. Again, it is a minor amount.

MR. LILLY: Let's go forward then to your next -- to Page 11 at Lines 9 through 12. You say: Findings from the studies in Casper Creek of the subsurface drainage process, summer flows, water yield and water balance can therefore be applied to the North Fork Gualala watershed. Ziemer, DFG 18, studied the water balance of both basins over a five-year period.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: What do you mean by "both basins"?

MR. CUSTIS: In the North Fork they have two studies called the South Fork and the North Fork Casper Creek, and what they have done over the last 40 years is sort of compare land management practices between those two basins.

MR. LILLY: You're not referring -- Ziemer never did any studies in the North Fork Gualala watershed?

MR. CUSTIS: No, he didn't do any studies in the North Fork Gualala, at least I am not aware of them. He may have. He's been doing studies in North Coast for at least 40 years.

MR. LILLY: But you are not relying on it?

MR. CUSTIS: I am not relying on any of his studies of the North Fork.

MR. LILLY: North Fork Gualala?

MR. CUSTIS: Yes.

MR. LILLY: You go to state: The measurement of the actual runoff from each of the two basins when compared to potential runoff found a 2 to 6 percent of the water was not accounted for.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: How did you determine the 2 percent figure?

MR. CUSTIS: If you put Ziemer's calculation up --

MR. LILLY: Just so the record is clear, you have Exhibit DFG?

MR. CUSTIS: Exhibit 18.

MR. LILLY: Thank you.

Go ahead.

MR. CUSTIS: Ziemer's annual precipitation over those five years was 1,188.3 millimeters. His stream runoff was 503 in the North Fork and 461 in the South Fork. And so what I looked at was if this is -- he summed these two up, the potential evaporation and runoff and something is missing. You have a water balance, imbalance. Taking that imbalance to the total precipitation, that is the

calculation.

MR. LILLY: Can you go just through the numbers? I tried to do it and I didn't get 2 or 6 percent. I would just like you to explain what numbers you used, kind of spell them out one number at a time.

MR. CUSTIS: I have it written down. Let me run through quickly and make sure it works out, I'm doing it right.

What I did, I think I took the potential evaporation from precipitation, which ends up being -- it is actually adjusted precip, PET, potential evapotranspiration. That leaves 527. He has precipitation minus that. That leaves 527.88 millimeters available runoff.

MR. LILLY: Right.

MR. CUSTIS: And in one case he actually got 503.

MR. LILLY: That is the amount of measured flow?

MR. CUSTIS: He had a gauge. You take 527.88 minus 503. That is 24.88 millimeters that is deficient.

MR. LILLY: Okay.

MR. CUSTIS: Divide that by the total precip which is 1188.3; that comes out to about 2.094.

MR. LILLY: So you divide it then by the 1188.3?

MR. CUSTIS: In other words, the issue is how much of the total precipitation is not accounted for.

MR. LILLY: What number did you get when you did that?

MR. CUSTIS: I got -- on the first one I got .02094, 2 percent.

MR. LILLY: The second one you got something close to 6 percent?

MR. CUSTIS: Yeah. It was actual, like, five and a half or something like that. So I rounded it up.

MR. LILLY: And they have measured stream flow in millimeters. I assume that means the total volume of water passing the gauge divided by the watershed area; is that correct?

MR. CUSTIS: I think that's correct.

MR. LILLY: Where were the stream flows made that were listed in these two tables, excuse me, the two rows at the bottom of Exhibit DFG 18?

MR. CUSTIS: My understanding from reading the text, Casper Creek is a -- they actually put out sort of a status report, which the papers I cited came from. My understanding is at the bottom of the watershed. But I don't know exact location for them.

MR. LILLY: Let me just hand you a map of the watershed which was on their website, and tell me if this shows you where the gauges are.

MR. CUSTIS: This shows a number of stream gauges.

MR. LILLY: Is it your understanding that basically to get these measured stream flows they took the gauge data for

basically the bottom of each of these little areas which would be where NFC and SFC are shown?

MR. CUSTIS: That would be my understanding since the water balance is for the whole watershed.

MR. LILLY: Just looking at this -- I guess we better label this. I think we are to Exhibit NGWC 16. I ask that this be labeled NGWC Exhibit 16.

Basically, Mr. Custis, if some other precipitation actually percolated through the soil into the bedrock features in the watershed and then discharged at some downstream point but above these gauges, SFC and NFC, then that type of water would be included in the measured stream flow numbers; is that correct?

MR. CUSTIS: That would probably be there, yes, if it came up as surface water, if it flowed as subsurface water it wouldn't be seen.

MR. LILLY: If it went into the bedrock and then discharged back into the stream at a lower point, it would be included in the stream flow measure; is that correct?

MR. CUSTIS: If it stayed in the stream, yes.

MR. LILLY: Just going back to your testimony, or moving forward in your testimony on Page 11 at Lines 16 through 17, it states: This rate of deep percolation is similar to that estimated by Parfitt and Germain, DFG Exhibit 6.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: What estimates by Parfitt and Germain are you referring to here?

MR. CUSTIS: What I took was as part of the Parfitt and Germain report were they made recommendations for, call it, zoning, how to in certain areas allow people to subdivide to a certain size. And one of those recommendations was for -- can't remember their exact term, but it is for the bedrock aquifers. They are the lower yielding, they recommended 20-acre minimum. They also talk about having per capita consumption of about .2, I guess, acre-feet per year per person.

MR. LILLY: Is that the part of this report that you have prepared as DFG Exhibit 6?

MR. CUSTIS: I believe we attached that part, yes.

MR. LILLY: These are not really estimates of deep groundwater percolation. These are really recommendations for housing or building densities; is that correct?

MR. CUSTIS: What it is is a recommendation based on their understanding of the groundwater setting, how much water could be assumed to be extracted. And they said if you can prove better yields that you can make the lot size smaller. Essentially my assumption is they made some finding internally that there is not a lot of water in that

bedrock, and this was their recommendation.

MR. LILLY: Does any of the part of Parfitt and Germain report contain any actual estimates of the deep percolation?

MR. CUSTIS: I don't think they actually do a calculation for deep percolation.

MR. LILLY: I'm going to hand you copy of the cover page and Pages 26 to 27 of that report and ask you to look at that, and I'll also ask that it be marked as Exhibit NGWC 17.

Mr. Murphey has corrected me, that excerpts of Pages 26 and 27 from the Parfitt and Germain report will be Exhibit NGWC 17. Appreciate the correction.

Have you had a chance to look at Pages 26 and 27?

MR. CUSTIS: Yes.

MR. LILLY: In fact, on Page 27 there is a table with estimates for deep percolation in different types of areas, both grasslands and forestlands; is that correct?

MR. CUSTIS: I am not sure if they define whether deep percolation is just percolation of the soils or actually in the bedrock. They may have combined them both. So they're looking at different vegetation types.

MR. LILLY: This is basically their estimates if you take the annual precipitation and subtract the surface runoff and evapotranspiration, it is their estimates of what percolates, either into the soil or into the soil and then

on into the bedrock?

MR. CUSTIS: Into the soil and/or -- actually a combination of both, yeah, conditions.

MR. LILLY: For forestlands they are estimating ten inches going into the soils and the bedrock?

MR. CUSTIS: Yes.

MR. LILLY: They don't distinguish between or subdivide that between what portion goes into just the soil versus what portions goes on into the bedrock?

MR. CUSTIS: No. This is also, I think, for the terrace deposits. So it is a different unit. Probably take a summary of this and estimated coastline, estimated Mendocino County coastline terraced deposits. They have different units, so I think this is for one unit terrace deposit.

MR. LILLY: But their methodology does not depend in any way on the soil type, does it, because it's just based on precipitation, estimated surface runoff and ET, and what is left is percolation?

MR. CUSTIS: I have to look at the detail on their counts, but I would assume there is a correlation between soil type and bedrock, that the soils aren't the same. By looking at the soils in the Gualala watershed, they are varied. I think -- I haven't looked at the terrace deposits to see if the soils are the same as the Gualala. I would

say I think there is probably a difference.

MR. LILLY: You don't know whether there is or not?

MR. CUSTIS: I would suspect that there is a difference, if I had to make a guess at it.

MR. LILLY: Does the Parfitt and Germain report contain any estimates of deep percolation into forestlands other than this Table 2, which is from Page 27?

MR. CUSTIS: I don't believe so.

MR. LILLY: Let's go forward to Page 11 of your testimony at Lines 17 through 19. You state: Keppeler and Brown, DFG Exhibit 19, studied subsurface drainage processes and found that for forested lands, such as Casper Creek and the North Fork Gualala watershed, seasonal effects of subsurface flows are manifest in the storage properties of forest soils.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: Did Keppeler and Brown actually study or say anything in their report about the North Fork Gualala watershed?

MR. CUSTIS: No. The reason I put this in is because it is a Franciscan coastal belt terrain and the land is similar geology, similar vegetation.

MR. LILLY: They were working in Casper Creek?

MR. CUSTIS: This is all Casper Creek studies, yes.

MR. LILLY: Going forward at Line 22 your testimony states: Keppeler and Brown study also found that much of the stream flow during the winter is from shallow soil types that rapidly drain off infiltrating precipitation.

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: My question is: Is there anything in Exhibit DFG 19 that actually supports your statement that much of the stream flow is from shallow soil types?

MR. CUSTIS: The -- I believe the Keppeler and Brown study found that most of the stream -- most of the infiltrating rainfall discharges through the shallow soils. A lot of -- they were particularly concerned or of interest in this soil types as to how water rapidly drains out, and you see a lot of soil types in the forested areas, so they concentrated on that.

MR. LILLY: You've submitted as Exhibit DFG 19 a copy of the report by Keppeler and Brown. Can you show me in there anywhere where it says "much of the infiltration drains through the shallow soils"?

MR. CUSTIS: Page 2, conclusions.

MR. LILLY: So can you tell us where you are reading. The first sentence after conclusions?

MR. CUSTIS: Yeah.

MR. LILLY: Go ahead.

MR. CUSTIS: You could go down to the third sentence: As the soil and subsoil becomes saturated, the soil pipes play an extremely important role in hillslope drainage. Next sentence: The combined water storage and transmissivity properties of shallow earth materials such as out of headwater watersheds produce significant storm runoff and dynamic changes in fluid pressure that are important factors in hillslopes. And then they go into talking about timber harvest management and loss of evaporation. Increase subsurface flow from the loss of rainfall interception and transpiration after timber harvest, increased deep pipe flow may accelerate scour erosion within the soil pipes.

Essentially they are talking about what is going on in the shallow surface, most of the runoff is coming from that zone as opposed to bedrock use. They don't get into bedrock in this.

MR. LILLY: They don't really get into bedrock, do they? They show on their Figure 1, which is back on the third page of this exhibit, that there is refractured bedrock. In fact their report also shows that some of the flow is through fractures in the bedrock; is that correct?

MR. CUSTIS: I think they would consider that regolith.

MR. LILLY: But the very third sentence of their abstract, the very beginning of their report on Page 1, says subsurface runoff can occur within micropores, voids between

soil drains, various types of macropores, structural voids between aggregates of plant and animal induced biopores and through the fractures in weathered and consolidated bedrock; is that correct, that is what that says?

MR. CUSTIS: Yes.

MR. LILLY: So they didn't really ever estimate or have any way of determining what portion of the precipitation that percolates into the ground goes through the shallow soils versus what portion goes through the deep fractures in the bedrock, did they?

MR. CUSTIS: If you look at the whole volume you would find people that did that, yes.

MR. LILLY: Have you submitted any of those reports?

MR. CUSTIS: No. Their main interest is what was going on in the shallow soils.

MR. LILLY: Going forward in your testimony on Page 11, Line 24, you say: Thus, research on North Coast forested watersheds suggests that most of the infiltrating precipitation drains to streams through shallow soils and/or weathered bedrock; is that correct?

MR. CUSTIS: What page?

MR. LILLY: The very last two lines on Page 11.

MR. CUSTIS: Yes. That is what it says.

MR. LILLY: Do you have any other references to support that statement other than the Keppeler and Brown report?

MR. CUSTIS: I didn't submit any others. The Keppeler and Brown start talking about pipe flows discharging a hundred to a thousand liters per minute out of pores. They were more pressure increases.

MR. LILLY: Let's go forward then on Page 12 of your testimony at Lines 7 through 12. You have Page 12 there? I'm just going to read it so we are on the same page here. If the average thickness of the channel bank soils is assumed to be at least one meter and the hydraulic conductivity and the hydraulic gradient of the shallow soils is similar to that used in the SWRCB's 1999 Garrapata Decision 1639, one foot per day and 0.25 respectively, then the banks of the 111.9 miles of the blue line channel in the North Fork Gualala watershed above Elk Prairie can provide the average May to October base flow of ten cfs (110 miles times 5,280 feet per mile times two banks times one foot per day times 0.25 feet per feet times three feet divided by 86,400 seconds per day equals 10.08 cfs.)

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: Does this calculation then estimate the maximum amount of water that can be transmitted through this one-meter thick soil layer into the blue line streams of the North Fork Gualala watershed?

MR. CUSTIS: Maximum?

MR. LILLY: Based on --

MR. CUSTIS: Actually, the one foot per day hydraulic conductivity -- this is basically Darcy's Law. One foot per day hydraulic conductivity is for the soils. Gualala's kind of at the low end of conductivity.

MR. LILLY: It might be a factor of two higher?

MR. CUSTIS: Yeah, could be. Soil conservation service lists different soils and different stratified, different permeabilities and stratification, so this is kind of a legend of that.

MR. LILLY: It might be a factor of two higher?

MR. CUSTIS: That's possible.

MR. LILLY: And, again, I think you said earlier, for Darcy's Law this is assuming a condition where there is actually a saturated soil condition; is that correct?

MR. CUSTIS: This would actually require that the three feet of saturated soil. And generally the soils in the area range from, according to Conservation Service, range from one to two meters.

MR. LILLY: Under the assumptions you made for this calculation, what would the average gain in stream flow be for these types of flows through saturated soils for each mile of perennial stream? In other words, can you just take the 110 miles of perennial streams here and divide that into the 10.08 cfs to get what the average would be per mile of

perennial stream?

MR. CUSTIS: Probably be .01 or .09.

MR. LILLY: 0.09?

MR. CUSTIS: 0.09, yes.

MR. LILLY: Besides DFG Exhibit 19, did you read any other reports regarding the Casper Creek studies?

MR. CUSTIS: I looked at some of the other reports on the Casper Creek studies, but trying to limit the number of exhibits.

MR. LILLY: I am just going to ask you to look at one more that was posted on their website which is entitled Overview of the Casper Creek Watershed Study by Norm Henry, I've copied the cover page and Page 4 from that report, and I'll ask that that be labeled as Exhibit NGWC 18.

I really just have one question about a sentence here on Page 4 under section Topography and Soils. In the second paragraph it says: The soils in the Casper Creek study basins are well-drained clay-loams, one to two meters in depth and are derived from the Franciscan sandstone and weathered coarse grained shale of the Cretaceous Age. They have high hydraulic conductivity and subsurface storm flow is rapid, producing saturated areas of only limited extent and duration.

Do you see that?

MR. CUSTIS: Say again. Where is that?

MR. LILLY: This is the first two sentences on the second paragraph.

MR. CUSTIS: Okay.

MR. LILLY: My question for you is: Have you reviewed this information before that has this description of the soils in the Casper Creek study basins and their high hydraulic conductivity and rapid subsurface storm flow?

MR. CUSTIS: I didn't see the -- I'm not finding the paragraph that you cite, the sentence that you cite.

MR. LILLY: I'm sorry, let's try again.

MR. CUSTIS: When you were talking, I was looking for it. That is why I missed your --

MR. LILLY: Do you see the heading Topography and Soils? Second paragraph there, where it says "The soils in," go ahead and read those two sentences?

MR. CUSTIS: The soils in the Casper Creek study basins are well-drained clay-loams, one to two meters in depth, are derived from Franciscan sandstone and weathered coarse-grained shales of the Cretaceous Age. They have high hydraulic conductivity and subsurface storm flow is rapid, producing saturated areas of only limited extent and duration. And he cites Wosika 1981.

MR. LILLY: My question for you is: Have you reviewed this part of this report before or any similar information from the Casper Creek studies describing the characteristics

of the soils in the study basins?

MR. CUSTIS: I didn't review this directly. The soil type I see is -- I don't see as being the same as in the Gualala, but the hydraulic characteristics may be, are pretty close. I would have to look it up; it may be higher.

MR. LILLY: Which would be higher?

MR. CUSTIS: The hydraulic conductivity in Casper Creek.

MR. LILLY: It is about the same ballpark as that in North Gualala watershed?

MR. CUSTIS: I would think so.

MR. LILLY: Let's go forward to Page 12 of your testimony. Just about done here. At Paragraph 28 and specifically that paragraph discusses the channel meander and point bar as you discussed this morning, and specifically at Line 25 your testimony states: Even with vegetation this point bar will allow surface waters to infiltrate whenever the river stage exceeds groundwater levels.

Do you see that sentence?

MR. CUSTIS: Right.

MR. LILLY: Do you have any data indicating what flows in cubic feet per second in the North Fork Gualala River are necessary before the river stage will exceed the groundwater levels as you've described here?

MR. CUSTIS: I don't have it down to groundwater

levels, but calculated bankful which is a Q, I don't know what cross sectional areas, I have Q for reaching essentially the top of the cut bank in the stream.

MR. LILLY: I was wondering if you can convert that to cubic feet per second of river flow.

MR. CUSTIS: I can give you what bankful river flow is in cubic feet per second.

MR. LILLY: Why don't you do that.

MR. CUSTIS: The discharge -- this is at the bottom of Robinson Creek mining watershed which is where Elk Prairie is located. And so it is a little bit farther along. It is right at the confluence with the South Fork, where North Fork bends and heads down to the South Fork and meets it. So that watershed area is at that point, see, you have a little bit of drainage from just that area south of Elk Prairie. But not -- or moving that, an estimate based on regional curves, would be about 2430 cfs would be bankful.

MR. LILLY: Is it your estimate then or your opinion that that type of flow at the point where the North Fork discharges or joins the South Fork, that level of flow would be necessary before you would have river stage up at the point bar exceeding the groundwater levels?

MR. CUSTIS: No. It might be lower. In other words, this is at the top of the -- if you took a cross sectional area, this is where you begin -- the water begins to flow

out on the floodplain.

MR. LILLY: My question is: What river flow does it take at this point bar you've described before the river stage exceeds the groundwater levels?

MR. CUSTIS: Based on calculation from the surface water data from the Luhdorff & Scalmanini report and the gradient of the stream that is actually taken from the -- during the pump test there was some surface water flows done by Rau Engineers, and they wrote a report on that. I believe that is the report that talks about the gauge, the flow measurements that were made. They calculated a stream slope between 0.24 and 0.3-something, 3 2 percent.

If you take the distance to the apex of that meander, it is about 900 feet. And so essentially water level will rise if it's 900 feet and you get 10 percent, that is nine feet. A third of that is three feet, a little bit less. So it is about 2.8 feet, 2.7 feet above stream gauge three. And that actually, when I looked at some, I didn't look at all, of the water levels that are reported in monitoring well, there is Table 4. I put it as an exhibit. One of the tables that had all the water level monitoring data, the elevations. I believe that you add that surface elevation to stream gauge three, that you get water levels that are higher than Monitoring Well 4. So water at common flows will go from that point bar area to the subsurface. I don't

know what flow that is, but it flows that you have measured and reported.

MR. LILLY: So you don't know what flow it takes before this condition will occur?

MR. CUSTIS: I think the condition occurred multiple times during the flows that you -- the stages that you recorded and reported. So it is a normal flow that it is going to occur.

MR. LILLY: I will try it one more time. Can you tell me what flow it takes for this condition to occur?

MR. CUSTIS: Well, if we go back to -- I don't have a stage curve. You guys did not calculate a stage, a Q for stage. So my guess is going to be that it is -- if you get into -- what I'm looking for is my North Fork Gualala gauge for the last year. This is DFG Exhibit --

MR. BRANCH: Exhibit 8.

MR. CUSTIS: DFG Exhibit 8 shows the daily discharge of three instream gauges on the Gualala. This was from last year. I know that last year was a particularly dry year. At least that is what the locals told me when we were out there. You have flows that go into June that are above ten cfs and run down into about three cfs in the summer. If these flows are comparable to what occurred when you took the water level data, the test back in '97, then I say it is probably three or four cfs.

MR. LILLY: Bottom line is you don't know what flow it takes at the point bar for this condition to occur?

MR. CUSTIS: Based on the data -- I think you can project backwards based on the data that is in your tables that water has flown from point bar to Monitoring Well 4.

MR. LILLY: You have not done that projection with that type of calculation; is that correct?

MR. CUSTIS: I think we just did where we looked at what the flow -- base summer flows of three cfs or equal to or less since last year was a dry year, than what was experienced in '97. I think three cfs or greater would do it.

MR. LILLY: That is just based on your looking at these flows and figuring that things might be about equal rather than any specific flow calculation up at the point bar?

MR. CUSTIS: Based on projecting the slope of the stream and it was measured by Rau Engineers upstream of the same or average gradient. I know the elevation of the SG 3, so now I know the surface water elevation approximately, and correlating that with -- assuming that most of the flow is coming from the North Fork and not from the Little North Fork, on this gauge last year.

We don't have any stage data in that meander to demonstrate what the elevation is, so I have to project back.

MR. LILLY: And you also don't have any flow data at that meander?

MR. CUSTIS: I have flow data, and I think this is probably a couple thousand feet downstream.

MR. LILLY: Let's go forward to Page 14 of your testimony. I will try to wrap this up.

CHAIRMAN BAGGETT: Thank you.

MR. LILLY: At Line 6 on Page 14 it says: Estimates of deep recharge to the bedrock are no greater than several inches per year.

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: What estimates of deep recharge to the bedrock are you referring to here?

MR. CUSTIS: It is based on testimony, Parfitt and Germain work on their recommendations for lot size in the Coastal Belt Franciscan, assuming that they wouldn't recommend a lot size that was smaller than what would be sustained with a 2.2 acre-feet per year per capita. That's primarily what --

MR. LILLY: At Lines 7 through 8 you say: A mass balance of the watershed indicates that May through October base flows are likely provided from drainage of the shallow soils rather than deep bedrock.

Do you see that sentence?

MR. CUSTIS: Yes.

MR. LILLY: What mass balance of the watershed are you referring to here?

MR. CUSTIS: That's the calculation where 110 feet, 110 miles of streams times 1 foot per day, basically saying that if that ten cfs can be delivered by the soils.

MR. LILLY: Then, finally down on Line 23 on this Page 14 of your testimony it states: Based on the facts discussed above under question eight, in my opinion significant groundwater recharge to the subsurface alluvium through bedrock is unlikely because of the low permeability and low water yielding capacity of the tightly fractured Sandstone graywacke bedrock. Data from the Luhdorff and Scalmanini report, as well as other information, leads me to conclude that the recharge to the subterranean stream alluvium at the Elk Prairie is occurring through other possible pathways.

Do you see that?

MR. CUSTIS: Yes.

MR. LILLY: And my question is: What data from the Luhdorff & Scalmanini report are you referring to here?

MR. CUSTIS: We were talking previously about the water stage readings that are in, I think it is, Table 4-1, but I'm not sure, Table 4-2. In Table 4-2 two areas. One is -- this is DFG Exhibit 14, Luhdorff & Scalmanini Table 4-2. I

think this is this second page of that table, so continued page.

MR. LILLY: That is the data you are referring to?

MR. CUSTIS: Yes.

MR. LILLY: One moment please.

MR. BRANCH: Chairman Baggett.

CHAIRMAN BAGGETT: Yes.

MR. BRANCH: I would just like to point out in the hearing notice it says cross-examination is limited to one hour a witness. I see we have run quite a bit past that at this point.

CHAIRMAN BAGGETT: Are you about finished?

MR. LILLY: I'm done. No further questions.

Thank you. Appreciate all your patience as a lot of technical stuff and, obviously, we had to have the witness go back and look at other documents.

CHAIRMAN BAGGETT: Thank you.

Mr. Lucey, do you have any?

You have to come up to the microphone.

---oOo---

CROSS-EXAMINATION OF DEPARTMENT OF FISH AND GAME

BY MR. LUCEY

MR. LUCEY: Thank you.

In your observations on your field studies, the five to seven days you spent on the North Gualala watershed, did you

observe the same springs and seeps that Mr. Scalmanini observed in May and September?

MR. CUSTIS: Not really. We weren't looking for the springs, but, no. That year was pretty dry.

MR. LUCEY: For all the observations and springs that we have seen, it seemed like they were very evident, they would be obviously right there. You didn't see any just walking around?

MR. CUSTIS: Generally, the river road that you take going into the North Fork essentially cuts across the toes of all those slopes.

MR. LUCEY: The springs, if they were existing --

MR. CUSTIS: I think we would have been driving through them if they were discharges. The road runs on the floodplain. Sometimes it goes up, generally on the floodplain. This used to be the old stand from Henry, the North Fork Gualala Water Company; that was the river grade that went up the river. So I would have expected that we have driven through them. I don't recall them.

MR. LUCEY: Thank you.

Thank you, Mr. Chairman.

CHAIRMAN BAGGETT: Any questions? I've got two quick questions.

---oOo---

//

CROSS-EXAMINATION OF DEPARTMENT OF FISH AND GAME

BY BOARD

CHAIRMAN BAGGETT: To follow up on the spring and seep question. I guess the first question: If there were -- we saw a picture representing -- an exhibit representing seepage and spring activity in that general area. As a geologist would that be indicative of any movement of water through that Franciscan formation out from areas above this that was represented by earlier testimony? Would you concur with the geologists that were on the first panel, the engineer, who testified that that was indicative of water moving through the Franciscan?

MR. CUSTIS: Depth?

CHAIRMAN BAGGETT: Coming out on the surface, discharging to the surface.

MR. CUSTIS: Well, if I saw a spring, what I would like to do is be able to investigate it. As Keppeler and Brown pointed out, a lot of the flow in the shallow soils comes through what they call soil pipes. Those are basically formed by rodents and then water creates a pipe in those. As odd as they sound, they are quite important. They're pointing out that a lot of the drainage through the soils, because those things occur in the swales. Those blue line streams are only a very small percentage of the stream area in that watershed. And so in the swales those soil tubes,

that's where they occur. And so if a spring is coming out, it may be that it is coming out of a contact between bedrock and soil, or may be coming out actually in fractures. You would have to look to make a judgment call.

CHAIRMAN BAGGETT: In this general area, since you seem to be familiar with the formations in this area.

MR. CUSTIS: I think in general in any bedrock terrain that would -- in the North Coast that would be, no matter what the formation, that would be a question you would want to know, you'd want to dig out and investigate.

CHAIRMAN BAGGETT: I had one other question.

It appears, based on the testimony so far, there is little debate over the existence of subterranean channel, if you will, the bed and banks issue.

MR. CUSTIS: That is correct.

CHAIRMAN BAGGETT: That's not my question. There is some background. The issue appears to be at this point, at least to my observation, very narrowly focused on the flow characteristics of the groundwater in Elk Prairie aquifer area. Based on that, what evidence can you point to to support our proposition that a subterranean or subsurface, if you will, flow in that aquifer is moving parallel to the North Fork channel?

MR. CUSTIS: Parallel.

CHAIRMAN BAGGETT: It is moving with the channel as

opposed to across the channel, under the channel?

MR. CUSTIS: I think what I refer to is -- see if I can find the figure. I think the subsurface characteristics don't allow it to move.

CHAIRMAN BAGGETT: We've had testimony to just the opposite. So I am asking what evidence do you have in your point of --

MR. CUSTIS: What I'm trying to answer is that you have a geologic setting which would not allow the water to flow parallel with the river. So to ask the water to flow parallel in a small location like that, wouldn't happen. It goes back to the point that I tried to make on, I have the contours --

CHAIRMAN BAGGETT: But that wasn't my question. My question was: What evidence do you have to show that? Not theoretically or not generally in this area. We have certain testimony, evidence, at this point that shows flow characteristic. I have an exhibit before me, Figure 4-5, the Luhdorff & Scalmanini report of 1998 shows we have movement of aquifer water, groundwater or subterranean water, moving from north to south.

Do you have any evidence that shows it moving other directions?

MR. CUSTIS: As we got in this lengthy discussion on -- the image that is up here is --

CHAIRMAN BAGGETT: The same image I just described, Figure 4-5.

MR. CUSTIS: Is one of the groundwater flow images, DFG Exhibit 14, Figure 4-5. We got in this discussion where I believe if you take the surface water elevation at SG 3 and take the slope that has been calculated along this area and follow it upstream 'round the bend here, we don't have a full meander, but that elevation is higher than the elevation at MW 4 a lot of the time.

If that is the case, then that flow would flow in this direction, would flow towards MW 4 upstream, essentially parallel to the Lower North Fork which you have a big meander here. I believe that what happens is it flows out of this area here to the east upstream at the point bar and because of the bedrock, the capping clay layer actually bends. These red contours actually show that. Groundwater has to bend along that boundary condition. These lines are pretty close to flow lines, based on water limit. So what I was trying to point out is I don't believe that in Elk Prairie area because of the subsurface conditions that you would expect to have this area water to be able to flow parallel with the North Fork in this area, but up here it does.

CHAIRMAN BAGGETT: We have no monitoring wells up there. This is the challenge.

MR. CUSTIS: What's that?

CHAIRMAN BAGGETT: There is no monitoring wells upstream?

MR. CUSTIS: I told you the method for doing that projection -- there are no monitoring wells up there. The method of doing the projections is to take the surface water level of what we have here, assume that we have a nearly consistent gradient in this area, the surface water, and that by adding this water level measured here to up there, I'm higher. I'm higher than the water level that is measured in Monitoring Well 4.

CHAIRMAN BAGGETT: Thank you.

Do you have any questions, Barbara?

---oOo--

CROSS-EXAMINATION OF DEPARTMENT OF FISH AND GAME

BY STAFF

MS. LEIDIGH: I just have a fairly record-type of question. In your Power Point presentation you superimposed numbers on several of the figures from DFG 14. Is that data that you superimposed on the figures in DFG 14 all in your written testimony or is there some of that that isn't in your written testimony?

MR. CUSTIS: In particular you mean this figure? This figure -- this information is in the well logs for Luhdorff & Scalmanini report. I'm not sure if we repeated it for

each well in the testimony, but it is in the exhibits.

MS. LEIDIGH: So is it in the DFG exhibits or in the North Gualala exhibits?

MR. CUSTIS: The actual well log is in the full Scalmanini report. If you look at cross-sections, DFG Exhibit 14, cross-sections A and B.

MR. BRANCH: Would it help if we made this a separate DFG exhibit?

MR. LILLY: I have a problem with that, obviously. Certainly we never had a chance to look at that.

CHAIRMAN BAGGETT: I do have a practical solution, you will get a chance for redirect here in a minute.

MR. CUSTIS: It would be Luhdorff & Scalmanini Figures 2-2, DFG Exhibit 14, cross section AA, Figures 2-3, this cross section BB. Those cross-sections depict what is in the well logs. And so the actual hard number is coming from the well logs, but I can interpolate from the cross section the elevation.

CHAIRMAN BAGGETT: The picture on the screen now with the dashed lines is not. That is the question, I think.

MR. CUSTIS: These numbers here?

CHAIRMAN BAGGETT: The numbers are there, but the representation is not, which is Mr. Lilly's objection. I would have to sustain that objection. But under rebuttal tomorrow or it would probably be a useful exhibit since

there was some much discussion about it. So maybe you could make copies of it with the lines as depicted and bring it back on your rebuttal testimony so we can have it in the record since there was no objection to the discussion of that document earlier, so we now have all this -- the graphic would be useful. So why don't we cure it that way, that way we don't have to go back and forth on procedural discussions.

CHAIRMAN BAGGETT: Any other questions?

Exhibits, would you like to -- I guess we should go to redirect, first.

Do you have any redirect?

MR. BRANCH: No. At this time I would like to move DFG Exhibits 1 through 24 into the record.

CHAIRMAN BAGGETT: We will deal with it tomorrow. I would like you to deal with it tomorrow. Bring it back as an exhibit on rebuttal and just enter it. So provide copies to all the parties and us with the colored dashed lines.

With that let's take a recess for ten minutes.

MR. LILLY: I would like to have a chance to object to the exhibits, if I can.

CHAIRMAN BAGGETT: Okay. Got to be quick.

MR. LILLY: I will be quick.

CHAIRMAN BAGGETT: Quick with those objections.

MR. LILLY: Usually people ask. I will be quick. On

Exhibit 1, which is Mr. Custis' written testimony I object to the part of Page 16, Lines 5 through 22, which talks about whether or not the pumping of North Gualala's wells have an impact on North Gualala River as not relative, simply not within the scope of the hearing issues. The impact of groundwater pumping on surface water flows is not the same issue as the issue of legal classification of the groundwater. Therefore, I object on the ground that that is not relevant.

The other objection I have is several of these reports, Exhibit 10 through 13 and Exhibit 19, obviously are reports prepared by other people, and I'll just -- I don't have an objection to them coming into evidence, but I would point out they are hearsay documents and should be subject to the Board's limitations on the use of hearsay evidence.

CHAIRMAN BAGGETT: That is 1 through 13 and 19?

MR. LILLY: Yes.

MR. BRANCH: As far as the impacts aspects, one of the reasons we put that in here is to demonstrate our interest in this hearing as far as we believe the pumping has an impact on the river and, therefore, any fishery resources that would be contained therein. As far as the hearsay objections for --

CHAIRMAN BAGGETT: Ten, 11, 12, 13 and 19, to allow them in since we don't have the experts to cross-examine.

MR. BRANCH: Or to take official notice of these reports.

CHAIRMAN BAGGETT: So you propose we take official notice?

MR. BRANCH: If there is an issue with hearsay.

CHAIRMAN BAGGETT: The objection was hearsay objection, which means we will consider the objection when we weigh the evidence as hearsay, which is, I think, what Mr. Lilly is asking for. I don't object to that, so we will do it. The evidence is admitted, but we will give it the weight of hearsay based on our terms. So, that is what we will do with those exhibits, 10 through 13 and 19 and the first Exhibit No. 1.

MR. LILLY: His written testimony.

CHAIRMAN BAGGETT: His written testimony. I would overrule. I think we've already got evidence into the record about pumping North Gualala, about pumping and cones of depression and the affect on flows. I think that is -- we will allow it in. With that --

MR. LILLY: I know you really want to take a break, but one last thing. I had some exhibits, NGWC 13 through 18, and I ask that those be admitted into the record now.

CHAIRMAN BAGGETT: No objection.

They are in the record.

Thank you.

Let's take a recess for ten minutes.

(Break taken.)

CHAIRMAN BAGGETT: On the record.

I guess I am struggling with, having read what you're proposing to testify about, what part of it is relevant to the narrow issues in our hearing notice.

MR. LUCEY: That is why I am probably wondering why I'm here trying to ascertain this. My relevancy being here is to inform the Board and to inform the Department of Fish and Game and to inform the National Marine Fisheries Service that this whole proceeding and the last 20 years have been an effort by the North Gualala Water Company and their attorneys to stretch out this procedure of complying with the DFG term limits in their permit.

The bypass flow for the steelhead and salmon has been ignored, has been not complied with, not enforced, and consequently the fishery has suffered and the steelhead and coho are in trouble. That is it.

CHAIRMAN BAGGETT: That is why you here.

MR. LUCEY: That is why I'm here, to prove that this whole thing, that the North Gualala Water Company has been, not a conspiracy, but they stretched it out, and they are going to continue doing that. You can see by the ambiguities here.

CHAIRMAN BAGGETT: We will definitely make that

determination. The issue, it is going to -- if you go back, we only asked two questions, I think you're probably aware, in the hearing notice, the two key issues: extracting groundwater from Wells 4 and 5, subject to the laws governing surface water rights, including requirements of a permit or a license to appropriate water is the first question.

The second one: Would the North Gualala extract groundwater that is subject to the laws governing surface water rights it installs pumps in groundwater in new wells on its property in the Elk Prairie area. That is what we are here to talk about.

MR. LUCEY: I understand that perfectly. If nobody speaks up for the rest of the issues, then there they are going to get buried. I feel it is my responsibility as a citizen to make sure that your Board, that you and your Board, are aware of some of the deep facts that have not been brought out that are important to these proceedings.

CHAIRMAN BAGGETT: I can appreciate that. I'm wondering whether a policy statement might not be, obviously more -- not limiting the policy statement to the exact issues noted and they aren't treated as evidence. If it is your goal, to introduce a policy statement so we can become aware of it --

MR. LUCEY: I could make whatever statement, if you

want to take it as policy or as evidentiary, I'm certainly not an attorney and I'm not going to try to be one.

CHAIRMAN BAGGETT: I understand that.

MR. LUCEY: Let's make it a policy statement. I was going to use my witness who I thought I had qualified as an expert witness, Mr. McDonald. We are both fishermen, so I hope that that is understood. So I can either ask Mr. McDonald the questions that we have gone over and done and I can read our little policy statement. But both of it is a policy statement. We tried to make it in a format, legal format.

CHAIRMAN BAGGETT: I understand. Let me see if I can come up with some resolve. I haven't even heard from the parties yet. I'm just waiting. What if both of you just give a policy statement for the record, and I let you both come up. You can give a policy statement to what you were going to talk about. It would be nonevidentiary in nature. It would be your concerns about the importance of this hearing, I assume, and try to keep it limited to five minutes.

MR. LUCEY: We can do it. Maybe five each, we can do it.

CHAIRMAN BAGGETT: Let me see if there is any objection to this.

MR. LILLY: Just so I am clear on what your proposed

ruling or process is. These exhibits would not come into evidence?

CHAIRMAN BAGGETT: As evidence; they would not be evidence. We would have two policy statements from two interested parties who live in the area, and I think clearly indicated an interest in these proceedings. It would be nonevidentiary in nature.

MR. LILLY: Under the Board's rules, all nonevidentiary policy statements are allowed from anybody. I just would caution, obviously they are going to say a lot of things that we disagree with, and we don't want to get into rebuttal to a policy statement. As long as the record is clear that that is where we are coming from, I don't have a problem with them giving policy statements under those conditions.

CHAIRMAN BAGGETT: I think that is clearly the rules of policy statements, they have been correctly articulated by counsel. It will not be evidentiary. I would ask that you have a policy related to those issues is what's interesting to us. We will give you five minutes each.

MR. LUCEY: I am going to distribute a couple of things. This is what Mr. McDonald -- was going to be testimony, but is now --

CHAIRMAN BAGGETT: Now a policy statement.

I understand our rules. You are not an attorney, and

it can get very complex. This is a public process. We do appreciate the public take, the time to come all the way down here and be interested.

With that, continue.

MR. LUCEY: I will make the policy statement by reading some of the facts.

The bypass flow violations of term nine of the North Gualala Water Company permit have been occurring and were reported to DFG and the Water Resources Board since the mid '80s, so we have been trying to do our part. The compliance and enforcement, although everybody is trying -- has been limited to strongly worded letters from the state and federal agencies, and nothing has happened.

The violation of pumping during the low flow periods continue to this day. Again, we were going to introduce the USGS report from their electronic monitoring that show pumping below four cfs.

CHAIRMAN BAGGETT: We will enter these attachments to your policy statement.

MR. LUCEY: I could, but they are not evidence. So it is not going to be allowed, anyway, so I just tell them that they do exist. The laws have violated. The pumping continues.

As I said, the North Gualala Water Company, their attorneys, they used just about every policy, not policy,

every -- I've got to use the word "procedure" that they could dig up to delay and continuously obfuscate these hearings. It has gone on for too long. They create a very costly rate structure in Gualala as the lady alluded to earlier, where our water bill in town is $41 before you're even charged for water. The fact that the North Gualala Water Company borrowed $4,000,000 from the state, and the ratepayers are repaying that at the $40 a month rate, is pretty expensive to the people in Gualala. And when some of the other things are in there with the properties that Mr. Bower and his family owns, kind of coincide with where his $4,000,000 to improve the water system went.

We think that is kind of a bad conduct on their part to take the state's money, the taxpayers' money and literally you don't get -- enrich themselves by improving their property values. It is not against the law to own property. But still we don't like to see the state's money going to improve it.

Whatever the outcome of this, whether it is groundwater or whether it is the underflow, our concern is still that the bypass flows that the DFG has put in place must be maintained through whichever jurisdiction or whoever has jurisdiction over the North Gualala Water Company, whether they have a permit or whether they don't have a permit. The steelhead and coho are both now on the federally listed

species or federally threatened species after March the 9th, by a ruling in Washington, D.C. So the National Marine Fishery Service and the federal government now has, I think, some more input.

So, and the last and final thing, I'm going to let Mr. McDonald address the mitigation to correct the problems that have happened in the past and the potential for an alternative water supply.

Don, I will let you take it over.

Thank you for your attention.

CHAIRMAN BAGGETT: Thank you.

MR. MCDONALD: Mr. Chairman, my name is Don McDonald.

CHAIRMAN BAGGETT: Pull the mike over to you. Make sure the button is on.

Thank you.

MR. MCDONALD: I am Don McDonald. I'm a graduate forester, so I do have a little bit of knowledge about forests and water.

My concern has been for 17 years that the North Gualala Water Company would prefer to ignore the rules and not be in compliance with the terms of their permit. As Jerry said, this started in the mid '80s, 1985. I think I registered a complaint with SWRCB and received minimal -- I would say minimal response, more or less stonewalling and so on for about five, four, five years. It went on and on, back and

forth.

And as Jerry says, the fishery is now in bad shape. And National Marine Fisheries Service is clear. Some of the species to be stressed out and actually on the list. As I say, my concerns -- I've listened now to all of this high powered hydrologist, geologist testimony for several hours, and I would like to impress upon you folks that all of this stuff that is going on here now was started by myself and Jerry 17 years ago. And what they are talking about really has nothing to do with the fishery. It has to do with technical stuff, as to whether or not the water has a subterranean flow and all this stuff. I am convinced that there is a hydraulic continuity with the underflow and the surface flow. Pumping does affect the surface flows. When the surface flows are affected negatively, it affects the fish because there is not as much water in the river. Habitat is where it is at. And Gualala town now has a plan to triple its service area. The Coast Commission has approved it. The county has tentatively approved it. In a few short years the service area will expand to the point where pumping will triple, and there will actual be a -- probably be a chance that it will pump the river dry below the diversion.

I have some numbers here from USGS for last year in August, September and October. The minimum bypass flow is

four cfs or are quit pumping. During that October, September -- August, September, October period of last year, there was 60 days approximately when they didn't meet their bypass flows. It was less than four cfs. And this is inexcusable. If they are pumping three times as much water, it's going to take water from the fish and maybe even take all the water out of the North Fork below the diversion.

These are my concerns. However you guys want to prove that with your technical jargon, I hope it's proven in favor of the fish. So this stuff that means nothing to the fish, means a lot to some of the people that live around here.

That is all I have to say.

CHAIRMAN BAGGETT: Again, thank you for coming down.

With that we have one final witness, and then State Water Rights Division, cross and after that we'll, I guess, come back with rebuttal at nine tomorrow. What I would like is maybe before you leave you can give me an idea how many witnesses and what kind of rebuttal you see.

MR. BRANCH: If I could respond. DFG, as rebuttal, is going to put forth the exhibit we were discussing at the end of cross-examination. That will be the extent of our rebuttal case, which we will submit to you today.

Mr. Custis is getting ten color copies to give to the Board.

CHAIRMAN BAGGETT: Maybe, Mr. Lilly, do you see

yourself having extensive rebuttal, having not heard the last witness?

MR. LILLY: A little hard to guess right now. But I would prefer to come back tomorrow. I don't think it is going to take a huge amount of time, but I do think we have -- Mr. Custis has raised quite a few things already that we are going to ask Mr. Scalmanini and Mr. Phillips to address.

CHAIRMAN BAGGETT: So it would be just two witnesses?

MR. LILLY: At this point it is possible. We have Mr. Bower, we have very short rebuttal. But it will probably just be Scalmanini and Phillips.

CHAIRMAN BAGGETT: Let's continue with the last.

MS. MAHANEY: Good afternoon. As you know, I'm Erin Mahaney, attorney with State Water Resources Control Board representing the Division of Water Rights permitting team.

Today, well, our only witness today is Charles NeSmith, an associate engineer and geologist with the division.

---oOo---

DIRECT EXAMINATION OF

DIVISION OF WATER RIGHTS PERMITTING TEAM

BY MS. MAHANEY

MS. MAHANEY: Please state your name and place of employment.

MR. NESMITH: My name is Charles NeSmith. I work for the State Water Board, Division of Water Rights.

MS. MAHANEY: Have you taken the oath in this proceeding?

MR. NESMITH: Yes I have.

MS. MAHANEY: Did you prepare the statement of qualifications that is submitted as Permitting Team Exhibit 2?

MR. NESMITH: Yes, I did

MS. MAHANEY: Is Exhibit 2 a true and accurate statement of your qualifications?

MR. NESMITH: Yes, it is.

MS. MAHANEY: Did you prepare the written statement that is submitted as Permitting Team Exhibit 1?

MR. NESMITH: Yes, I did.

MS. MAHANEY: Are the statements in Permitting Team Exhibit 1 true and accurate to the best of your knowledge?

MR. NESMITH: Yes.

MS. MAHANEY: Please summarize your understanding of the groundwater classification that is subject to the Board's permitting authority.

MR. NESMITH: The groundwater is subject to the Board permitting authority is groundwater flowing through a known and definite channel in accordance with Section 1200.

MS. MAHANEY: In your opinion, what are the physical characteristics to be considered or that the Board has considered in the past in determining the legal

classification of groundwater in California?

MR. NESMITH: The most recent test -- the most recent case is the Garrapata test. And there is four criteria that are used in the Garrapata test. One is is there a subsurface channel present? Does the channel have relatively impermeable bed and banks? Is the course of the channel known or capable of being determined by a reasonable inference, and is groundwater flowing in the channel.

MS. MAHANEY: If the subsurface body satisfies those four conditions, is it then a subterranean stream flowing in a known and definite channel and subject to the Board's permitting authority?

MR. NESMITH: Yes.

MS. MAHANEY: Does the character -- do the factors under the Garrapata test require the groundwater flow be parallel?

MR. NESMITH: No, they don't. I don't know of any prior case where the Board requires that it be parallel to the stream, the groundwater flow be parallel to the stream.

MS. MAHANEY: In nature is there any case where groundwater flow is truly parallel?

MR. NESMITH: In very rare cases, maybe limestone cavern or a lava tube, that might be the case. But in most cases and nearly all cases, there is some interchange

between the channel and the bedrock.

MS. MAHANEY: Would you please describe the groundwater flow in the Elk Prairie area?

MR. NESMITH: If you refer to Exhibit 5B, this is a groundwater contour map that Luhdorff & Scalmanini prepared for their 1998 report. And it shows groundwater flowing in a southwesterly direction. In some areas it is flowing at a high angle, and at other areas it is flowing perpendicular. I don't have any objection to this contour map.

MS. MAHANEY: In your experience in division proceedings regarding the classification of water, is the source of the water relevant to the determination of whether groundwater is a subterranean stream flowing in a known and definite channel?

MR. NESMITH: No.

MS. MAHANEY: Applying the criteria, we'll call it the Garrapata test, have you reached a conclusion regarding the classification of groundwater extracted from Wells 4 and 5?

MR. NESMITH: Yes.

MS. MAHANEY: What is that?

MR. NESMITH: The conclusion is that it's subject to the State Water Board's permitting authority. It is a subterranean stream flowing through a known and definite channel.

MS. MAHANEY: Thank you.

CHAIRMAN BAGGETT: Is that it?

MS. MAHANEY: I can be short.

CHAIRMAN BAGGETT: Thank you.

Mr. Lilly.

---oOo---

CROSS-EXAMINATION OF

DIVISION OF WATER RIGHTS PERMITTING TEAM

BY NORTH GUALALA WATER COMPANY

BY MR. LILLY

MR. LILLY: Good afternoon. Is it NeSmith?

MR. NESMITH: NeSmith.

MR. LILLY: If I don't get it right, please correct me. I will try to pronounce it correctly.

MR. NESMITH: Okay.

MR. LILLY: As you know, I am Alan Lilly, attorney for North Gualala Water Company. According to your resume, you graduated from college in 1981?

MR. NESMITH: Uh-huh.

MS. MAHANEY: Please say yes or no because the Court Reporter can't get uh-huhs down, or she gets them down as uh-huhs but we don't know whether they mean yes or no.

MR. NESMITH: Yes.

MR. LILLY: I will start over. Did you graduate from college in 1981?

MR. NESMITH: Yes.

MR. LILLY: Did your first work experience that is described in your testimony begin in 1988?

MR. NESMITH: My first work experience? No.

MR. LILLY: I said the first work experience that is described in your testimony, and you might look at the second paragraph of your testimony.

MR. NESMITH: Okay.

No, that is not my first work experience out of college.

MR. LILLY: Why don't you just tell us, what did you do between 1981 and 1988?

MR. NESMITH: I worked for -- right out of college I did a Placer gold exploration work out in Nevada. Then I was hired to do geophysical exploration work in the southwest.

MR. LILLY: That gets you to --

MR. NESMITH: Well, when the oil business went down the tubes, I ended up going to graduate school.

MR. LILLY: Now the fourth paragraph -- first of all, do you have your written testimony in front of you?

MR. NESMITH: Yes.

MR. LILLY: That is, just for the record, that's Permitting Team Exhibit 1. I will just refer to it as your written testimony.

Going down to the fourth paragraph, your testimony

states that you started working for the Division's complaint unit approximately one year ago; is that correct?

MR. NESMITH: Yes, that's correct.

MR. LILLY: The description in that paragraph lists several projects. My question is: Have you been involved in any hearings in any of these projects since you started working for the complaint unit?

MR. NESMITH: No.

MR. LILLY: Shifting to the present hearing, did you discuss anything about it with Mr. Custis as you were preparing your exhibits and testimony?

MR. NESMITH: We had the general discussions in the same manner that Mr. Custis testified to.

MR. LILLY: Did you discuss anything regarding the present hearing issues with Mr. Scalmanini as you were preparing your testimony?

MR. NESMITH: No.

MR. LILLY: Going forward to Page 2, at the very top of the page of your written testimony, it says you visited the site on March 14th and April 8, 2002; is that correct?

MR. NESMITH: Yes.

MR. LILLY: Are those the only two times you have been out on the site?

MR. NESMITH: Yes.

MR. LILLY: How long were you out on the site during

each of those two visits?

MR. NESMITH: The site visit, the first one, was about three and a half to four hours. Then the second visit was when everybody else went up there. I guess that lasted about five minutes.

MR. LILLY: The second one --

MR. NESMITH: They lasted about a half hour, I guess, the fieldwork when we were out there in April.

MR. LILLY: The time in April was the field tour that State Board had scheduled?

MR. NESMITH: Yes.

MR. LILLY: One other thing, Mr. Custis, before the --

MR. NESMITH: Mr. NeSmith.

MR. LILLY: Excuse me, Mr. NeSmith. Before the Court Reporter gets really angry at you or me, please wait until I finish my question before you start your answer because she can only take down one person at a time, and sometimes even that is hard if one of us talks too fast.

Going forward to Page 3 of your testimony, which is Figure 1, entitled Location Map for the Gualala River. Do you have that in front of you?

MR. NESMITH: Yes, I do.

MR. LILLY: It looks like there is a line called Gualala River, and then as it goes to the coast it kind of splits in two. I wonder if you can tell us which one of

those two lines that goes over to the ocean actually is the river.

MR. NESMITH: Well, the river bends and goes south. I extracted this from -- it was a portion of the map that DFG submitted, the landslide map. This was just sort of a location. It is a very generalized map. That portion there, no, that is not the Gualala River, but the southern portion, yes.

MR. LILLY: What you referred to as the Gualala River, is that actually the North Fork of the Gualala?

MR. NESMITH: North Fork of the Gualala River.

MR. LILLY: Going forward to the next page of your testimony, Figure 2, where did you get this map?

MR. NESMITH: This map was excerpted from the Department of Fish and Game map.

MR. LILLY: That is the one that Mr. Custis previously has described?

MR. NESMITH: Yes.

MR. LILLY: Does this map show the location of any earthquake faults?

MR. NESMITH: The San Andreas Fault.

MR. LILLY: Other than that?

MR. NESMITH: Not this map, no.

MR. LILLY: Let's go forward to Page 7 of your testimony. In the first full paragraph, the first sentence

starts: As noted by staff and acknowledged by permittee (Exhibit 7 and 8), in 1982 Department of Water Resources report entitled Mendocino County Coastal Groundwater Study, indicated that the mean specific capacity of wells screened in the Franciscan bedrock near Elk Prairie is 0.265 gpm per foot, Exhibit 10.

Do you see that sentence?

MR. NESMITH: Yes, I do.

MR. LILLY: Where did you get Exhibit 10?

MR. NESMITH: Exhibit 10 is from the permit file.

MR. LILLY: Does the permit file, in fact, contain the whole report?

MR. SMITH: The permit file, I do not know whether it contains the full Mendocino County report.

MR. LILLY: Did you read any other portion of the report other that than table?

MR. NESMITH: I focused on that aspect of the report.

MR. LILLY: The aspect being the table that you submitted?

MR. NESMITH: Yes.

MR. LILLY: Then in that sentence when you say in parentheses near Elk Prairie, what exactly do you mean?

MR. NESMITH: Close to -- are you talking about the -- we are talking about the specific capacity in the bedrock wells. Near meaning the closest bedrock wells that were

available to look at.

MR. LILLY: Do you know how many miles away those bedrock wells are?

MR. NESMITH: It is about 15.

MR. LILLY: If you can, please turn to Page 8 of your testimony, in the second full paragraph, the one after the two bullet points, then there is a paragraph and a text and then the next paragraph that begins, "The minimum magnitude."

Do you see that paragraph?

MR. NESMITH: Yes.

MR. LILLY: I am going to read the second sentence of that paragraph which states: The SWRCB selection of the PMIN is the single most important factor that will ultimately determine the number of subterranean streams that are found in California under the Garrapata test.

Do you see that?

MR. NESMITH: Yes, I do.

MR. LILLY: In your opinion does the State Water Resources Control Board need to consider any factors besides the value of PMIN when it is deciding whether or not a subterranean stream exists at a particular location?

MR. NESMITH: It needs to consider the three other factors in the Garrapata test.

MR. LILLY: First of all, in your opinion of PMIN,

then, the same question of whether or not the bed and banks are relatively impermeable compared to the channel?

MR. NESMITH: Yes.

MR. LILLY: Going on to the fourth paragraph on Page 8, I won't read the whole first sentence, basically if I can paraphrase. You say if the PMIN is set at the one order of magnitude nearly 95 percent of alluvial channel surrounding the stream is an area of high relief would be considered subterranean streams.

Do you see that?

MR. NESMITH: Yes, I do.

MR. LILLY: What do you mean by alluvial channel surrounding the stream is an area of high relief?

MR. NESMITH: Alluvium typically surrounds a stream. And in the case of the Gualala River the alluvium that is yellow on the DFG -- that is a typical situation where you have alluvium that surrounds the stream.

MR. LILLY: This is a very typical configuration for stream channels in California?

MR. NESMITH: I would say so, yeah.

MR. LILLY: Where in California do such channels occur?

MR. NESMITH: Virtually every stream I have looked at while working for the Division of Water Rights.

MR. LILLY: They are distributed throughout the State of California?

MR. NESMITH: I think that is reasonable prediction, that it is throughout the state, yes.

MR. LILLY: How did you determine the 95 percent figure that is in that sentence?

MR. NESMITH: Simply educated guess.

MR. LILLY: Could you elaborate? Do you have expertise in this area and what did you do to make your educated guess?

MR. NESMITH: It is based on the case work that I have looked at, these streams, and in looking at different permeability contracts with these streams and just general knowledge about permeability differences between alluvium part indicated by the color chart.

MR. LILLY: I am going to ask you the same question about the next sentence. You have a statement basically that PMIN is set at two orders of magnitude than the number of subterranean streams would be reduced to about 70 percent.

Do you see that?

MR. NESMITH: Yes.

MR. LILLY: What is the basis of the 70 percent?

MR. NESMITH: Same information, just educated guess.

MR. LILLY: Let's go forward to Page 9. In the first full paragraph on Page 9 of your written testimony you state my recommendation is to set the PMIN at one order of

magnitude. Do you -- excuse me.

The next sentence reads: An order of magnitude difference is significant. It means that the water has a ten to one preference for flowing through the channel rather than its bed and banks.

Do you see those sentences?

MR. NESMITH: Yes, I do.

MR. LILLY: What do you mean a ten to one preference?

MR. NESMITH: Order of magnitude ten to one.

MR. LILLY: What does preference mean?

MR. NESMITH: Preference would be preference for the water to flow through the channel rather than the bedrock.

MR. LILLY: Can you put it in terms of any normally used scientific terms for groundwater flow?

MR. NESMITH: No.

MR. LILLY: In the case of a ten to one preference, as you have described it, would the flow of groundwater be generally parallel to the channel?

MR. NESMITH: Not necessarily.

MR. LILLY: You would have to look at other factors?

MR. NESMITH: Yes.

MR. LILLY: If the PMIN factor in a different channel were a hundred, so there was a hundred to one preference, would that affect whether or not the groundwater flow was likely to be parallel to the channel?

MR. NESMITH: Yeah. The more difference in permeability, the more likely you are to get parallel flow.

MR. LILLY: In that first paragraph there, the last sentence says: It also means that a well installed completely in bedrock will have ten times less the performance of a well installed in a channel and thus have significant reduced potential impact on the nearby stream compared to the well installed in the channel.

Do you see that?

MR. NESMITH: Yes.

MR. LILLY: What do you mean by the term "performance"?

MR. NESMITH: Usually measured by specific capacity.

MR. LILLY: That is the amount of pumping yield per foot of drawdown?

MR. NESMITH: Yes.

MR. LILLY: In a situation where you have a PMIN of ten, if there are two wells and one is installed in the bedrock and the other installed in alluvial material and they are both the same distance from a surface stream and both pumping at the same rate, is it your opinion that the well in the alluvium material will have a ten time impact than in bedrock?

MR. NESMITH: Rephrase.

MR. LILLY: I will split it up. Basically, I want you to vision a situation where you have a PMIN value of ten.

Okay?

MR. NESMITH: One order of magnitude.

MR. LILLY: Fair enough. Also a situation where there are two wells the same distance from the stream. Okay? And one of those wells is completely and solely in alluvial material and the other is completely and solely in the fractured bedrock materials. Okay?

Then my question -- and they are both pumping the same gallons per minute, same rate. Okay?

My question is: Is it your opinion that the well in the alluvial materials has ten times as large an impact on the stream flow as the well in the bedrock?

MR. NESMITH: Yes.

MR. LILLY: Now on Page 9 of your testimony in the second full paragraph you state that if PMIN is over one order of magnitude then few subsurface streams will be found to be subterranean streams subject to the Board's permitting authority. The second sentence states that it will result in unregulated groundwater extraction from the alluvium associated with a large number of California streams and the potential negative impacts from these uncontrolled groundwater diversions.

Do you see that sentence?

MR. NESMITH: Yes, I do.

MR. LILLY: Is it your opinion that wells that are not

within the State Water Board right permitting authority are completely unregulated and uncontrolled?

MR. NESMITH: They're generally unregulated and uncontrolled, yes.

MR. LILLY: What is your understanding of the State Water Resources Control Board authority to regulate well pumping under provisions of California law that prevent waste or unreasonable use of water?

MR. NESMITH: Repeat the question.

MR. LILLY: Is it within the State Water Board's authority to regulate well pumping and under a provision, say, of California law that prohibits waste and unreasonable use of water?

MS. MAHANEY: Objection. Mr. NeSmith is not a legal expert. He is not qualified as a legal expert.

MR. LILLY: Excuse me, he already testified that he has a year experience with the complaint unit, and his testimony goes into quite a bit of detail about what the impacts will be of State Board jurisdiction and not jurisdiction under certain circumstances. I believe he opened the door to allow me to ask follow-up questions on that.

CHAIRMAN BAGGETT: Your question is regarding groundwater, isn't it?

MR. LILLY: Yes. Basically he has said if there is no State Board jurisdiction there will eventually be flow

regulation. I asked him whether or not the State Board could still regulate the pumping under its waste and reasonable use authorities.

MS. MAHANEY: There is no foundation laid that Mr. NeSmith has actually participated in a proceeding involving waste and unreasonable use. This proceeding has been limited to the identification of subterranean streams.

MR. LILLY: I will ask the foundational questions. We will find out.

CHAIRMAN BAGGETT: You still have a problem with relevance.

MR. LILLY: I guess the question is whether or not his testimony to be relevant and since he raised this point I have opportunity to follow up on it. He has indicated parade of horrible actions will happen here if the State Board doesn't expand or vigorously assert its water rights permitting jurisdiction. I'm entitled to elicit testimony as to whether or not that opinion is really valid.

CHAIRMAN BAGGETT: I have -- I guess I'm still having a challenge of relevancy objection. Can you give me some reason to say what the State Board policy and his opinion statewide on groundwater and these other issues has to do with this particular issue before us. His testimony is as a geologist not an attorney.

MR. LILLY: Well, his testimony states -- I will just

read the sentence --

CHAIRMAN BAGGETT: I would like to get to the policy here, not to determine -- not to go back over what Joe Sax said, Mr. Lilly, or whether the State Board's policy on subterranean streams is percolating groundwater. The issue before us is the fact of this particular river.

MR. LILLY: Here is my problem and you tell me how you want to handle this. He recommends setting a PMIN of one order of magnitude, the first paragraph on Page 9. In the second paragraph on Page 9, he says his PMIN is set higher than one order of magnitude then few subterranean streams will be found to be subterranean streams under the Board's permitting authority. This will result in unregulated groundwater extraction and potential negative impacts.

So it appears to me that he has offered this testimony to support his recommendation that the Board set PMIN at one order of magnitude. And if you are telling me that you are not going to qualify his testimony, I don't need to get into that. At that time the point he is submitting this as a reason for why the Board should have PMIN be set at one order of magnitude. If that is something the Board's going to consider, I should have the right to cross him on whether or not that is a valid conclusion that he's reached here.

CHAIRMAN BAGGETT: We stated this is a narrow issue. We are trying to get at the facts of this case, how it

applies here, and not a statewide issue.

MR. LILLY: Probably foundation question will take care of that.

CHAIRMAN BAGGETT: That would be helpful. Granted, and realizing that the witness can be limited to your knowledge and expertise, and if you're knowledgeable to address legal questions, so state.

With that, continue.

MR. LILLY: Thank you.

Mr. NeSmith, in your work for the last year for the complaint unit in the Division of Water Rights have you had any cases involving issues of waste and unreasonable use of water?

MR. NESMITH: Not as the primary issue, no, not that I can recall.

MR. LILLY: Do you have any understanding regarding California law regarding waste or unreasonable use?

MR. NESMITH: I have a general understanding.

MR. LILLY: What is that?

MR. NESMITH: That is a clause that in the code where you can claim was the unreasonable use and use it as a complaint, part of the complaint to alter someone's diversions.

MR. LILLY: Would that, what we will call, alter, would that be where the State Board decided to issue an order,

that they could limit the diversions if they thought there was waste or unreasonable use of water?

MR. NESMITH: Yes.

MR. LILLY: Do you have any understanding as to whether or not that that provision of California law would apply to well pumping that is not other -- that is not within the State Board's water right permitting water authority?

MR. NESMITH: Theoretically, it could.

MR. LILLY: In your work in the complaint unit have you ever had any dealings with -- in a matter where there was an issue involving the Public Trust Doctrine?

MR. NESMITH: Those two are -- not primary issue, no.

MR. LILLY: Do you have any understanding of the Public Trust Doctrine?

MR. NESMITH: Very general.

MR. LILLY: What is that general understanding?

MR. NESMITH: It is one reason that -- the public trust, as I understand, are interrelated in excess and unreasonable use of water, could be an impact on the public trust.

MR. LILLY: Do you have any understanding as to whether or not, in your opinion, the State Board could regulate pumping of a well not within the Board's water right permitting authority if it impacts on public trust issues?

MR. NESMITH: It's theoretically possible. I have not

seen it yet.

MR. LILLY: Are you aware that most California counties have well permit requirements?

MR. SMITH: Yes.

MR. LILLY: Are you aware that permits from the California Department of Health Services are required for well supplies as a municipal water system?

MR. NESMITH: Yes.

MR. LILLY: Let's go forward to the last -- the next sentence in that paragraph, says: Additionally, there may be no State Water Board protection for current purveyors against new wells installed near their point of diversion.

Do you see that?

MR. NESMITH: Yes.

MR. LILLY: In your experience with the complaint unit, have you ever seen a case where the State Water Resources Control Board has taken any action to limit the pumping of a well to protect the user of an existing well?

MR. NESMITH: For groundwater that is under our jurisdiction?

MR. LILLY: For any groundwater.

MR. NESMITH: Well, for groundwater that is under our jurisdiction it's encoded in the permit, the limitations.

MR. LILLY: My question is: Have you seen a case where the State Board has taken action to limit well pumping by

the well owner because of the impact on another well owner?

MR. NESMITH: I have not seen that.

MR. LILLY: Are you aware that under existing law any user of an existing well may bring a court action to a California court to limit the pumping of a well if it impacts their well?

MR. NESMITH: Yes.

MR. LILLY: Are there any wells in Elk Prairie besides the North Gualala Water Company wells?

MR. NESMITH: In the alluvium?

MR. LILLY: Anywhere in Elk Prairie.

MR. NESMITH: I am only familiar with the five wells, supply wells installed by North Gualala and the monitoring well for the investigation, that we installed for this investigation.

MR. LILLY: Let's go forward to Page 10 of your written testimony. In the first full paragraph after the three numbers, the second sentence states: Luhdorff & Scalmanini assert that conclusion one indicates that significant seepage is occurring from the bedrock into alluvium and that this shows that the bedrock is not sufficiently impermeable as compared to the alluvium to form the bed and banks of subterranean stream.

Do you see that sentence?

MR. NESMITH: Yes, I do.

MR. LILLY: Have you read the Scalmanini report?

MR. NESMITH: Yes.

MR. LILLY: Can you tell me where in the Scalmanini report you believe that this statement is made?

MR. NESMITH: It is frequently indicated throughout the Elk Prairie for the whole premises of the report.

MR. LILLY: You are not aware of a specific statement itself?

MR. NESMITH: My interpretation of the conclusion of the report.

MR. LILLY: Let's go forward to Page 11 of your testimony, and the second paragraph, the second sentence states first under the Garrapata test it does not matter which direction the groundwater is flowing, eg., from bedrock to alluvium or whether the stream is influent or effluent because the subterranean stream is an alluvial channel bounded by the bedrock bed and banks.

Do you see that?

MR. NESMITH: Yes.

MR. LILLY: One of the Permitting Team exhibits, Exhibit 6, is the Garrapata decision. I would like you to tell me where in the Garrapata decision it says that it does not matter which direction the groundwater is flowing?

MR. NESMITH: I couldn't point to an exact statement in the Garrapata test and Garrapata order.

MR. LILLY: Can you point to a statement in the Garrapata order that supports your statement here, the direction of groundwater flow does not matter?

MR. NESMITH: No.

MR. LILLY: Do you know which direction the groundwater in the vicinity of the well involved in the Garrapata case was flowing?

MR. NESMITH: I don't recall.

MR. LILLY: Have you reviewed any of the exhibits or testimony from that matter or just the decision?

MR. NESMITH: Just the order.

MR. LILLY: Just a minute, I have to find it. What I've got here is the testimony from Mr. Peltier, one of your colleagues, to the Garrapata test. I will ask that this be marked as Exhibit NGWC 19. It is only six pages long. All I really want you to do is look at the conclusion at the bottom of Page 5.

MS. MAHANEY: That is the decision you are referring to?

MR. LILLY: This is the testimony of Mr. Peltier.

MS. MAHANEY: I believe that this precise testimony, only new evidence that is allowed on the bottom.

CHAIRMAN BAGGETT: This is cross. He can bring in evidence on cross as an expert. That is the rules.

Mr. Lilly, Mr. NeSmith, have you had a chance to read the conclusion at the bottom of Page 5 of Exhibit NGWC 19?

MR. NESMITH: I am going to do that right now.

Okay.

MR. LILLY: Specifically, there is a sentence that is, I think, the fifth sentence. It says: The groundwater in the alluvium beneath Garrapata Creek is flowing under force of gravity in the same general direction as Garrapata Creek and is in hydraulic continuity with the surface stream and is flowing in a course with a space reasonably well defined.

Do you see that sentence?

MR. NESMITH: Yes.

MR. LILLY: Do you have any reason to doubt this conclusion that the groundwater is flowing in the same general direction as Garrapata Creek?

MR. NESMITH: The general description from 89 degrees to parallel is in the same general direction is not specific enough.

MR. LILLY: Do you have any evidence to indicate that the groundwater flowing in the Garrapata Creek was not generally flowing in approximately the same direction as the creek?

MR. NESMITH: No.

MR. LILLY: I would like to go forward to Page 12 of your written testimony. In Section 3.3.4 you referred to the recharged zone impact test. Do you see that?

MR. NESMITH: Which page? Where is that?

MR. LILLY: Page 12.

MR. NESMITH: Yes.

MR. LILLY: Where does this test that is discussed on this page come from?

MR. NESMITH: This test, the different aspects of this test came from the Joseph Sax report.

MR. LILLY: Mr. Baggett, I would like a ruling on this. I realize that this hearing is kind of going parallel with the Professor Sax proceeding that the Board commissioned. And I have a bit of a quandary here. If the Board is going to consider this testimony regarding recharge zone impact test, then obviously we have a fair amount of rebuttal to put on that our contention is that this test is not an appropriate test to determine whether or not groundwater is flowing in a subterranean stream.

MS. MAHANEY: My reading of the hearing notice says evidence should be presented to include any report for the participant's advocate. It is up to the Board to set the test. He didn't know we are going to -- we felt, like, the testimony should be applied as a possible test. As you can tell from direct testimony, we focused on the Garrapata test.

CHAIRMAN BAGGETT: Give me a five-minute recess. I have to think this through.

(Break taken.)

CHAIRMAN BAGGETT: Back on the record.

First, I would like to ask Division of Water Rights counsel what was your --

MR. LILLY: Mr. Branch is not here. I don't know if you want to wait for him to come back.

CHAIRMAN BAGGETT: I want to clarify what --

MR. LILLY: He is back now.

CHAIRMAN BAGGETT: What is the Division of Water Rights' position about this testimony? Is it going to stay or did you say because the Board -- my point in the hearing notice was to solicit what test should -- a determination was made --

MS. MAHANEY: We decided we better cover all bases. So that is why the written testimony covers that.

CHAIRMAN BAGGETT: So I guess the question is your intention is to leave it in as part of --

MS. MAHANEY: I don't want the test -- the test -- the Board isn't going to decide -- I'm reluctant to take it out.

CHAIRMAN BAGGETT: Prolong this hearing by at least a day.

MR. LILLY: I have a problem.

CHAIRMAN BAGGETT: I have a real problem.

MR. LILLY: We have to submit other evidence on what is wrong with it.

CHAIRMAN BAGGETT: I have more of a problem than you have. I understand. If it stays in, I can't act as Hearing Officer. Withdraw testimony from a witness, so --

MS. MAHANEY: Perhaps a compromise where if the Board makes a decision in its order coming out that somehow touches whether the division will be willing to withdraw that portion of its testimony. But if the Board somehow incorporates it into a future order, we then have an opportunity to --

CHAIRMAN BAGGETT: We already made the determination that we aren't going to adopt the regulation. That's pretty clearly stated in the public record.

MR. BRANCH: Does that take the Sax test completely out of the picture as far as this hearing goes?

CHAIRMAN BAGGETT: Does in terms of the policy of this Board.

MS. MAHANEY: If the point of the Board is that that test will not be, we are willing to withdraw it.

CHAIRMAN BAGGETT: Okay.

MR. LILLY: If he withdraws that part of the testimony, I won't ask any questions about it and I won't offer any rebuttal regarding that.

CHAIRMAN BAGGETT: Okay. That is okay that that portion of testimony is withdrawn regarding impact test, and we can proceed with the balance of your questions.

MR. LILLY: I don't have any other questions. I would like to offer our Exhibit NGWC 19.

CHAIRMAN BAGGETT: Right. Any objection to the exhibit?

If not, so entered.

Fish and Game, do you have any cross?

MR. BRANCH: No, thank you.

CHAIRMAN BAGGETT: Mr. Lucey, do you have any --

MR. LUCEY: No.

CHAIRMAN BAGGETT: Pete.

Barbara, do you have any questions? Or Paul?

With that the witness is excused and you have --

MS. MAHANEY: I'm sorry, could I ask a couple questions on redirect? I believe that is allowed.

CHAIRMAN BAGGETT: Yes.

MS. MAHANEY: I will be brief; I promise. Just two questions.

---oOo---

REDIRECT EXAMINATION OF

DIVISION OF WATER RIGHTS PERMITTING TEAM

BY MS. MAHANEY

MS. MAHANEY: Mr. NeSmith, are you familiar with any Board decision in which the Board has exercised its waste and unreasonable use or public trust authorities over groundwater wells not subject to the Board's permitting

authority?

MR. NESMITH: No.

MS. MAHANEY: If you take a look at Permitting Team Exhibit 6, Page 4.

MR. NESMITH: I don't know if I have that in front of me.

MS. MAHANEY: You have my copy. Read the fourth condition down of the Garrapata test.

MR. NESMITH: Groundwater must be flowing in the channel.

MS. MAHANEY: Thank you. I would like to request that Permitting Team Exhibits 1 through 12 be admitted into evidence.

CHAIRMAN BAGGETT: Any objection?

MR. LILLY: May I have just a minute? I think we've taken care of my only concern.

CHAIRMAN BAGGETT: Is there any recross on those two narrow questions?

MR. LILLY: I don't have any --

CHAIRMAN BAGGETT: Recross?

MR. LILLY: Two of their exhibits I think the Board has already ruled on, I think parallel to the staff exhibit, but Exhibit 3 is the Application 21883 and Permit 14835 issued thereon. And I object to that on the ground of relevance. Exhibit 4 is State Water Resources Control Board Order WR

99-01. I object on the ground of relevance. They did not deal with the issues of groundwater classification. And then finally I just ask that Exhibit 7, which is a letter from Mr. Anton to me, is not clear what purpose that is being offered for, and obviously that also is hearsay. I object to it on the ground of relevance and hearsay. Relevance, it may be that they can explain some purpose of it at this point. I don't see any purpose for that coming in.

CHAIRMAN BAGGETT: What are the other two?

MR. LILLY: Three and four, object on relevance grounds. And seven I object on relevance and hearsay.

CHAIRMAN BAGGETT: Three is already admitted, has already been put in by the Board's own motion.

MR. LILLY: You may have ruled, but I want to state my objection for the record.

CHAIRMAN BAGGETT: The objection is noted, but it is already admitted. That takes care of three.

MS. MAHANEY: That is relevant to show additional wells, 4 and 5, to the permit because the underlined permit won't necessarily reflect that.

MR. LILLY: I believe the Board already ruled on that.

CHAIRMAN BAGGETT: The Board didn't rule. We withdrew. That is our exhibit.

MR. LILLY: That is different. The issue is still

open.

CHAIRMAN BAGGETT: The witness used this to rely on.

MR. NESMITH: I stated in part as a correspondence exchange between the permittee and Water Board staff at the time where the issue was specific capacity came up.

MS. MAHANEY: I will move to seven now.

CHAIRMAN BAGGETT: Let's deal with four. Four, they have asked and brought as part of their testimony. That is a little different than the Board putting in on its own motion.

Do you have any other comment or same objection?

MR. LILLY: I don't think it had anything to do with the issues that are noticed for this hearing. I object on relevance grounds.

CHAIRMAN BAGGETT: I will overrule. A previous order of this Board can be cited.

MS. MAHANEY: As for 7, that is cited for nonhearsay purpose, not cited for the truth of whether or not there is subterranean stream. It is cited for perception of the arguments being made by the parties as bearing as relevant to the issue of the permit.

MR. LILLY: I don't understand what relevance Mr. Anton's perception of our or North Gualala Water Company's position was for this hearing.

MS. MAHANEY: The hearing notice asked for evidence

regarding the various tests. One of the debates was about whether it is water-bearing. My witness wants to raise that as one of the issues to be discussed with respect to those tests, not for the truth of the matter asserted in those letters, but for nonhearsay purpose.

CHAIRMAN BAGGETT: Mr. Lilly.

MR. LILLY: Submit the matter for the Board's decision.

CHAIRMAN BAGGETT: I will admit the letter for the purposes at indicated by the witness and its used rely upon the point, not for the truth of the statements made within the letter. So we will accept it under our hearsay rule.

Any other -- with those caveats, are there any other objections?

If not, the Division of Water Rights' exhibits will be entered into evidence for those notices.

Anything else?

Off the record.

(Discussion held off record.)

CHAIRMAN BAGGETT: Back on the record.

The rebuttal, Fish and Game is first. We will begin rebuttal with Fish and Game and their rebuttal testimony as one exhibit, Exhibit Number 25.

MR. BRANCH: Label 25.

CHAIRMAN BAGGETT: On the rebuttal no testimony, just

the exhibit.

MR. LILLY: What I propose is if we can just look at this overnight. This is the first time we have seen it. I don't think I have any problem with it, but I would like to try to figure out what is going on and see -- if we can tell you tomorrow, do the ruling the first thing tomorrow morning since we are coming back.

CHAIRMAN BAGGETT: It is offered as rebuttal testimony. Okay, that is fair.

We will, then, come back tomorrow morning with Fish and Game. I will rule on this evidence and you have -- Mr. Custis will be here tomorrow?

MR. BRANCH: Yes.

CHAIRMAN BAGGETT: If there is a question about the foundation.

We are in the same room tomorrow morning, 9:00.

North Gualala, do you have any witnesses?

MR. LILLY: We will have them organized tomorrow so they can be as succinct as possible.

CHAIRMAN BAGGETT: I am trying -- at this point I am trying to get all rebuttal presubmitted. Since it is tomorrow, if you can give us an idea of who you are going to have.

MR. LILLY: I haven't gotten it totally, but it will be Mr. Phillips with regard to some of the points made, the

geologic points of testimony particularly from Mr. Custis and Mr. Scalmanini will testify to a couple hydrologic points he had some disagreement with, there is a place where the characterization of his report he had a different characterization.

CHAIRMAN BAGGETT: That is helpful to all the parties, so they know what to think about tonight.

With that, we are recessed until tomorrow at nine.

(Hearing adjourned at 3:50 p.m.)

---oOo---

REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
) ss.
COUNTY OF SACRAMENTO)

I, ESTHER F. SCHWARTZ, certify that I was the official Court Reporter for the proceedings named herein, and that as such reporter, I reported in verbatim shorthand writing those proceedings;

That I thereafter caused my shorthand writing to be reduced to typewriting, and the pages numbered 6 through 200 herein constitute a complete, true and correct record of the proceedings.

IN WITNESS WHEREOF, I have subscribed this certificate at Sacramento, California, on this 23rd day of June 2002.

_____
ESTHER F. SCHWARTZ
CSR NO. 1564