ISSUES CONFERENCE VOLUME 14

In the Matter of the Applications of

CROSSROADS VENTURES, LLC

for the Belleayre Project at Catskill Park
for permits to construct and operate pursuant to
the Environmental Conservation Law

Margaretville Fire House
Margaretville, New York
July 29, 2004

B E F O R E:

HON. RICHARD WISSLER,
Administrative Law Judge

A P P E A R A N C E S:

WHITEMAN, OSTERMAN & HANNA, LLP.
Attorneys for Applicant,
CROSSROADS VENTURES, LLC
One Commerce Plaza
Albany, New York 12260

BY: DANIEL RUZOW, ESQ., of Counsel
BY: TERRESA M. BAKNER, ESQ., of Counsel

NEW YORK STATE DEPARTMENT
of ENVIRONMENTAL CONSERVATION
Region 3
21 South Putt Corners Road
New Paltz, New York 12561

BY: CAROL KREBS, ESQ., of Counsel
Regional Attorney

LAW OFFICE OF MARC S. GERSTMAN
Attorneys for CATSKILL COALITION,
ROBINSON SQUARE
313 Hamilton Street

Albany, New York 12210

BY: MARC S. GERSTMAN, ESQ., of Counsel

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(9:46 A.M.)

P R O C E E D I N G S

MR. GERSTMAN: We'll premark these exhibits.

(LETTER DATED 7/21/04 FROM AUDUBON NEW YORK RECEIVED AND MARKED AS CPC EXHIBIT NO. 78, THIS DATE.)

("EMPIRE STATE TRAILS - HIGHLIGHTS OF NEW YORK STATE" RECEIVED AND MARKED AS CPC EXHIBIT NO. 79, THIS DATE.)

("GROUNDWATER IMPACTS OF THE BELLEAYRE RESORT" RECEIVED AND MARKED AS CPC EXHIBIT NO. 80, THIS DATE.)

(ATTACHMENT 2 - "WELLBORE SHORT-CIRCUITS IN A FRACTURED-ROCK AQUIFER, CATSKILL MOUNTAINS, NEW YORK - MANAGEMENT CONSIDERATIONS" RECEIVED AND MARKED AS CPC EXHIBIT NO. 80A, THIS DATE.)

(PARTIAL PAUL RUBIN TESTIMONY RECEIVED AND MARKED AS CPC EXHIBIT NO. 81, THIS DATE.)

("BELLEAYRE RESORT YIELD TEST OF WELL R1" RECEIVED AND MARKED AS CPC EXHIBIT NO. 82, THIS DATE.)

("BELLEAYRE RESORT YIELD TEST OF WELL R1" RECEIVED AND MARKED AS CPC EXHIBIT NO. 82A, THIS DATE.)

("USGS HYDROGEOLOGY OF THE BEAVER KILL BASIN IN SULLIVAN, DELAWARE, AND ULSTER COUNTIES, NEW YORK" RECEIVED AND MARKED AS CPC EXHIBIT NO. 83, THIS DATE.)

ALJ WISSLER: If we could begin. Today is July the 29th. This is the Issues Conference in the matter of the application of Crossroads Ventures continued. I'd like to begin with the appearance of counsel, please.

MR. GERSTMAN: Marc Gerstman, Catskill Preservation Coalition.

MR. RUZOW: Dan Ruzow and Terresa Bakner for the Applicant.

MS. KREBS: Carol Krebs for Department Staff.

ALJ WISSLER: It's my understanding we will be continuing water supply, as well as doing groundwater and surface water impacts today and tomorrow.

Mr. Gerstman.

MR. GERSTMAN: Yes, your Honor. Just a few housekeeping details. First, there

was -- in connection with Exhibit 30, a letter had been an attachment to that exhibit and I believe part of the letter had been cut off, and I would like to provide additional copies of that. This is part of Exhibit 30. (Indicating)

We have marked exhibits, a couple of things we owed you. Exhibit 78 is a letter from Dr. Burger to Cheryl Roberts dated July 21st, 2004. I think it puts to bed the suggestion that the designation of the IBA, as Ms. Bakner had suggested, was in any way related in terms of the timing to this project review. This is CPC 78.

CPC 79 is in anticipation of our site visit on the Belleayre to Balsam Trail. We have copies of a booklet entitled, "Empire State Trails, Highlights of New York State," that describes the Big Indian Wilderness Area and describes it as being -- offering numerous opportunities for solitude and remote and rugged environment. As soon as I find the copies I made, I'll be glad to provide them.

Exhibit 80 is the PowerPoint presentation of Dr. Andrew Michalski.

Exhibit 80A is attachment 2 to Dr. Michalski's PowerPoint. It's a supplemental page just in case it's not legible.

CPC 81 is the partial testimony of Paul Rubin, essentially supplemental testimony to what has already been submitted.

82 is Belleayre Resort Yield Test Well, Well R1, prepared by Paul Rubin.

82A is also Belleayre Resort Yield Test Well R1; it's a blowup of part of 82.

CPC 83 is a report from USGS entitled, "Hydrogeology of the Beaver Kill Basin in Sullivan, Delaware and Ulster Counties," prepared by Richard Reynolds.

Judge, I'd like to introduce you this morning to Dr. Andrew Michalski and Mr. Paul Rubin. Dr. Michalski's curriculum vitae is attached as Exhibit 4 to the CPC petition. He's already submitted comments for the record concerning the surface and groundwater impacts which will result from the pumping of water supply by Crossroads Ventures in this project.

What we have concluded is that the methodologies and the conclusions drawn by

Crossroads do not provide sufficient information that Crossroads Ventures can withdraw the proposed volume of water from the Rosenthal wells without having a significant adverse impact on surface and groundwater hydrology.

What your Honor will hear at the end of August from our aquatic habitat experts is that there will be significant impacts to the aquatic habitat from the withdrawal of water by the Crossroads projects.

Dr. Michalski, would you describe your background to Judge Wissler, please.

DR. MICHALSKI: I'm a professional hydrologist with 35 years of experience, of which over 20 years is in the US, and I have a Master's in Engineering Geology, Hydrogeology and Ph.D. in Technical Sciences, both from Poland -- Krakow, Poland.

In the US, I work for major -- I have -- I had senior level positions with several environmental firms. And for the last nine years, I'm independent consultant.

I'm a Certified Groundwater Professional, which is a national

certification. I have extensive experience in site characterization for siting purposes or for contaminant investigation. My particular expertise is in fractured bedrock characterization and conceptual model of groundwater bedrock.

I'm a recognized expert for Newark Basin. I have -- I taught at Rutgers University, on a part-time basis, Basic Hydrogeology. I gave some advanced courses on fractured bedrock, and I probably participated in a thousand of different projects related to site characterization and site remediation.

MR. GERSTMAN: Dr. Michalski, would you tell Judge Wissler what documents you reviewed in order to come to your conclusions in this project.

DR. MICHALSKI: I reviewed major portions of the entire application related to groundwater, surface water issues and Draft Environmental Impact Statement.

MR. GERSTMAN: I want to show you Crossroads Exhibit 51A through D. Would you take a look at those for a second, and let me know if you have seen those before, whether

you reviewed those documents.

For the record, they are the application for public water supply permits dated May -- 51A is originally dated January 15th, 2002, revised May 2, 2004, for Big Indian Plateau, along with the Conceptual Design Report. And 51C and D are dated

December 2002, revised May 2004 for the Wildacres Resort.

DR. MICHALSKI: Yes, I did review them, and my comments I provide were based on a version of my submission, because my comments were prepared in March or April, but my testimony today will cover the entire new version.

MR. GERSTMAN: Could you summarize for Judge Wissler the conclusions that you reached concerning the work that was done by Crossroads to support their water supply permit and their evaluation of surface and groundwater impacts.

DR. MICHALSKI: With your Honor's permission, I suggest we go to PowerPoint -- because of my accent, it's probably better that you can see what I say.

These are major groundwater related comment on the DEIS. First is proposed pumping rates from Rosenthal supply wells currently at 149 g.p.m -- in the previous version, it was 120 g.p.m -- cannot be sustained in the long run. Long-term stabilization of pumping groundwater levels is not likely at such rates. By long-term, I mean six months. I believe -- my evaluation of data show that you can not get stabilization of pumping groundwater levels at such rate.

The next comment is the pumping from Rosenthal wells would subtract the baseflow to Birch Creek. Whatever you can would ultimately be subtracted from Birch Creek at dry season, which is my primary concern. Likewise, the proposed use of the Fleischmanns wells would reduce baseflow in Emory Brook. So in my comment, it was evident that groundwater pumped from the well ultimately subtracted or comes from the brook.

Next one. Extensive lowering of bedrock groundwater levels over a large area -- I'm talking about miles -- will

adversely impact other groundwater users within several miles' area.

Now, cumulative impacts and interference from new large withdrawals at the two proposed resorts, ski area, and other developments needs to be considered, as they all compete for a limited groundwater resource.

So this is my point, is Applicant did not consider cumulative impact or interference of pumping at the two proposed centers, which are a couple of miles away, and also withdrawals at ski resort and ski area and Pine Hill area. Because all of them compete for limited groundwater resources.

The major comment is additional hydrogeologic information and data are necessary for the entire area. I mean between

Pine -- Indian Point and Fleischmanns -- in order to adequately assess impacts on groundwater resources and develop reliable monitoring of groundwater quality changes. And one of the impacts on water quality changes which was not addressed includes potential for saline water, for salt water

upward movement because of the pumping. So this is my major comment.

With your Honor's permission, I would start with hydrogeology background, go through pumping and so on. So that's the question. The first issue is how do we envision bedrock hydrogeology? How does it work? What is the hydrogeologic framework of groundwater flow in bedrock? So several concepts will be reviewed.

In the DEIS, bedrock is implicitly treated as a single aquifer unit without any distinct features. If any features are discussed, they're discussed verbal. They're not tied to any site-specific wells, information, just very generic talk. Only old county water supply reports are mentioned, which is for Ulster County and for Delaware County. No reference to recent US hydrogeologic studies in the Catskills are made. No illustrations of site-specific hydrogeology by means of maps or sections I provided -- which your Honor will see later on what I mean by sections.

Now, Reynolds, which is a prepared

report which was submitted by counsel.

MR. GERSTMAN: CPC Exhibit 83.

DR. MICHALSKI: Exhibit 83. And in -- he gave his conceptualization, a portrayal of the Catskill Formation in the area directly south of the project area, which is Beaver Creek area, in that area. So he conceptualization -- his conceptualization of bedrock includes a series of stacked aquifers separated by confining units.

We can go to next slides. We will come back later.

This slide shows conceptualization of groundwater flow and its relation to stream in this area. So we have topography typical of a valley area. Bedrock is -- consists of shale and sandstone which are shown to be horizontal. The arrows show direction of groundwater flow in the bedrock. So the thinner layer indicated the contact betweenthe those thinner layers, which are marked like shale, indicates the major flow zones in his portrayal.

So we don't have one aquifer but a series of stacked aquifer which are

semi-confined. The groundwater can, with some difficulty, cross from one layer to another, but it would prefer to go horizontally to follow this confining unit. As this section shows, formation of spring, higher elevation spring which are, in fact, a contact spring that intersects. They show situations where groundwater -- the aquifer, you need, as I call it, this intersect with topography, therefore water just issues in the form of spring, and they're shown like little wiggly lines. So they contribute to surface flow.

Stream is at the bottom. This conception shows also overburden which is just a stippled area. In that part of the world, overburden is quite extensive. It is measured in hundreds of feet sometimes.

In our situation, Pine Creek and Emory, overburden is very thin. It consists only -- like a Pine Hill water supply area, thickness of overburden is 40 feet, and Emory Brook area, 20 feet.

In addition, this overburden consists of till material, so have relatively low permeability. So it doesn't have a good

water-bearing transmissive capacity. Such a capacity can be found in Esopus Creek and other creeks which have a better, more developed valley.

This conceptualization is correct, except that you probably would need to subtract some of the overburden which is missing actually at Beaver Creek area.

ALJ WISSLER: Doctor, let me ask you this: Are you saying that this stacked aquifer condition exists in Birch Creek and Lost Clove and the areas around?

DR. MICHALSKI: Yes, your Honor, and I will show evidence for that. The only purpose for this slide is to let you know that it is not one aquifer but a series of stacked aquifers. And it is controlled by stratigraphy, by different strata. And you can have springs at high elevation and all this system, in a typical valley setting, tends to flow towards the valley feeding the stream. It's a time when there's no recharge, no rainfall over a period of time, groundwater is the only contributor to flow in the stream, which is called a baseflow, low-flow

situation. I would go -- maybe go back for a moment to the main slide.

I'm going to now discuss Heisig. He conducted extensive study in the Bataviakill Valley which is north of this site -- Ulster, Greene County, somewhere. What he found is that -- his major conclusion is that there's a preferential flow along few low-angle bedding fractures that act as major water-bearing units.

What he actually says is that the flow is not in the entire thickness of sandstone. It is not. It is concentrated to sit on bedding planes which are more transmissive.

So instead of flowing the water through the entire section -- bedding planes access preferential, tabular aquifer, thin, preferential flow -- collecting flows from adjacent aquifer because the system is leaky. So this is his finding.

Bedrock has very little storage. It has transmissive capacity. It can act as a pipeline, but there's very little water in it, in bedrock, because even sandstone in Catskill Formation, primary porosity is just sealed by

various geologic processes. It doesn't count much.

So the only flow is through fracture. As you can observe this, you can see the fracture. The effect of these bedding planes can be seen at high elevation during wintertime when you see icicles probably forming, and quite often you can see those icicles. They signal water coming out from the seepage zone from the formation. Whenever you see this starting, this is water-bearing. I remember driving in the Catskills in the wintertime.

Another conclusion is that pumping -- bedrock has little storage. Because it has little storage, pumping effect extend a mile up and down the valley. This is his statement.

Another important point is that there

would be short-circuiting of groundwater along open holes -- I shouldn't say holes, I mean open well bores -- is important element of this. Because you have -- normally your well consists of steel casing near the top just to case over some overburden. Sometimes it's

only -- like in the case of Fleischmanns Well -- it's only like 10, 20 feet or so or less, and everything else is just an open well bore which can be 400, 600 feet long.

Because of this design, various aquifer units are intercepted by this, and each unit may have a different water level potential, therefore you have a cross flow, water flowing up and down in the hole.

Every borehole creates a disturbance in the system. It's like a wound in the system, and he stated this. It -- cross flow provide also information about the system, but they need to be considered. So it's not only that pumping well which is important, it is important if you have any well which crosses the system because it also affect the groundwater flow in the system, even if it is not pumped.

Now, another point, his point is over-pumping can induce upwelling of saline water. And it happens. In Batavia Creek Valley, at least he mentions three wells which produce saline water. Salinity is close to seawater because it's down there, and this saline water constitutes the lower boundary of the aquifer. And it's normally -- thicknesses of aquifer he estimated in bedrock, he estimated to be 200, 300 feet.

MR. GERSTMAN: Dr. Michalski, the Heisig report --

DR. MICHALSKI: Yes, this is Heisig report. Because it didn't show up -- I tried to scan it, it didn't show up well -- I included this abstract of Heisig's report in Exhibit 80A which contains certain supplements of stuff. So you can -- just browse through it and see it.

MR. GERSTMAN: I didn't mean to take you away from your prior conceptualization, your last point.

DR. MICHALSKI: Knowing what we know about real bedrock south and north of the site, what are the indications at the site that actually -- that the Heisig concept apply? And I will go through some of them.

These are records for Pine Hill -- drilling records for Pine Hill Well #1. Water-bearing fracture at R2. They all show that the entire flow comes from one or two

distinct zones or distinct fracture. Response of Residential Well 4 to pumping, cascading of water which is noted in two occasions. They're all evidence of how actually the bedrock works. There's a multi-unit, leaky aquifer system which measure flow.

So we can go maybe to the -- just for illustration -- for drilling records for Pine Hill Well #1, because we will just have a look at the bedrock from driller's perspective. Because this is not very good -- I mean scanning -- I refer you to Exhibit 80A on page S-2. And S-3, we have the same, much more readable.

So what we have is Titan Drilling Corporation. On the left side, we have just description, depth and description of strata drilled by driller. As you note, at 87 feet, between 87 and 150, he began to get into sandstone, from shale to sandstone. And he found water, the first indication of water.

On the right column of the driller observation, he described what he did. So first he installed surface pipes. On the first day, he drilled to 59 feet and installed
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casing, sealed pipe and grouted it. So he installed the casing.

The following day, on September 26th, '01, he grouted it, finished grouted. Then the next day, he went to -- and started drilling. And started drilling and found water -- it says, "Yield at 99 feet, 20 gallons a minute," and I note that somebody else wanted to overwrite it with 11, but it's original 20 g.p.m. And he drilled -- on that day, he went to 250 feet, and then he checked the hole and checked yield again, and all he got was 25 g.p.m., 25 gallons a minute. So he got increases. If he went 100 feet, 150 feet deeper, his yield increase only by five gallons a minute, so not much.

ALJ WISSLER: Would you interpret that entry for 9/29. What does that mean? It says, "Blew hole, static level, 9.5" --

DR. MICHALSKI: The driller used air to carry cuttings from the water. So at the end of the drilling, he uses air to blow water out of the hole, to create like a pop soda effect, and then he determines a yield. But before he did this, he measured water level in

the well, and water was 9 feet below his reference, like ground surface on top of casing. So 9 feet from ground surface.

So the next day, he continued drilling to get to 399 feet, 400 feet. And blew the hole again. But before blowing the hole, he measured static water probably at 13 feet, and yield was only 30 gallons a minute. So this well produced, according to this, 30 gallons a minute from 400 feet for the entire open section. Why at 99 feet, this one fracture produced 20 gallons a minute, two-thirds of water?

So I'm giving it as an illustration of very discrete nature of occurrence of this water-bearing zone. It's not the entire 400 feet that counts. What counts is the position of those transmissive fracture which presumably are bedding fracture, we didn't see, but you can see it by looking down into the hole.

Another point I want to make is that the static level dropped. When you go deeper, the water level dropped, which is inconsistent. If in a valley setting, if you

use bedrock as a system, water should go into the stream. But in this case it went down.

What it means, it means that the fracture, bedding which are near the bottom, has connection to stream or another area at the lower elevation, and it steals the water. So in this case, because it's a mountain area, it's a topographic effect. So in this case it can represent the movement of water to Fleischmanns area because of dip, of such a graphic dip of bedding to the west.

MR. GERSTMAN: Dr. Michalski, following up on the issue of what would you expect to happen in a homogeneous aquifer? You started to touch on that.

DR. MICHALSKI: It is not what you would expect -- homogeneous aquifer. Not homogeneous. One aquifer system, it's difficult to have this kind of situation.

Coming back to well -- Pine Hill Well #1, to the drilling records, actually I found the record of pumping test, short-term pumping test performed by Alpha Science, subsequent to completion of this well, and Alpha performs step drawdown test, which involve pumping,

step pumping of the well -- a different drawdown, a different pumping rate.

So they first start to get certain low pumping rate. Pump it for an hour or so until drawdown stabilize, then they increase the pumping rate to higher, kept it constant for another hour or so, and they went until the drawdown actually went haywire. It didn't stabilize. It is a standard procedure of testing.

ALJ WISSLER: So the drawdown went what?

DR. MICHALSKI: Went down at a very fast rate, could not be stabilized. This is a pretty standard procedure to evaluate the performance of the well itself. It doesn't tell you much about aquifers; it's more about the well.

So the page, which is at page 4 on Exhibit 88, which is a supplemental, just -- I indicated -- so on the left side, left column, say, "Time and drawdown and depth to water." Depth to water -- drawdown is the difference between original depth to water and pumping level, how much water level was depressed. So the column says, "depth to water," the third column, time and depth to water. And on the right side, we have pumping rates. So if the well was pumped at 38 gallons a minute approximately, it was the third step. It was one of the last steps.

As you can see, on -- let's look at the column, fourth column, depth to water. What is the depth? 89.225. We know that fracture was at 99. So I just indicated -- my handwriting in green. I said "fracture." And what I did, I compared drawdown, how fast drawdown above the fracture and below. So above the fracture, water level dropped 15 feet in 40 minutes. So during 40 minutes of pumping, drawdown went down by 15 feet at this pumping rate.

Now, when drawdown, water level dropped below this fracture, drawdown is the same. In another 40 minutes, drawdown increase by 56 feet, nearly three times or four times as much.

So simply it tells you that this fracture produce most of the water. If you go down below this fracture, you are not gaining

much at all.

I'm saying that because there's some argument about location position of the pump. We have a lot of available drawdown below a fracture. Because of a pump, our hole is deeper, it pumps at the lower elevation. It doesn't work this way. This is a clear indication. When you go below the very transmissive structure for hydrology reason, you get a very lousy hydraulic performance. So we can only count from inflow from the transmissive fracture.

Another point I want to make is the recovery phase. When they finished this pumping, they stopped pumping as they let water level to bounce back or recover. In the right column, it's a very -- when you have depth to water, 89, because they measure water level when it recovers. So against 89.27, it says, "And cascading." So they apparently, during the pumping recovery when the pump was off, they hear water just rushing in the hole and it rush, rush, and it suddenly became quiet and stop at 90 feet. This is 99 feet when this transmissive fracture again became

saturated.

So all in all, if you look at the simple records, it tells you that this aquifer is not -- you cannot consider it as a one aquifer system, but to have a very distinct fracture here at Pine Hill, 99 feet, and then as a fracture, if present, are not very transmissive.

And you could do it by certain tests. You could just -- I define hydrogeology -- hydrology of this well. It was not done.

Temperature conductivity would simply reveal all the location of those fractures, and it is a standard approach of this bedrock hydrology.

MR. GERSTMAN: So the characterization of the bedrock hydrology is possible using the existing data from these pump tests?

DR. MICHALSKI: Yes, but you should go one step further. I'm not trying to blame them for not doing this because they probably were -- it's not proper use for them, but it was not done.

So in this supplemental page, next page in Exhibit 80 included 80A. Page S-5 has a record for Rosenthal -- one page from record

drilling logs from Rosenthal Well R2. And it is not the driller's original records, which I would prefer. It's a sanitized version or a computerized version of it.

What it says in the right-hand column, says 182 fracture. Then it says 186 fracture with substantial water production. So in this adapted to water, it should say substantial water production. So it's a very transmissive fracture.

There was no indication in the records about any significant water. And then what it says below it, 190 sulfur, other. So it means that you don't have fresh water. You are in a different aquifer zone, you didn't have fresh water. After blow test at 199 yields 68 gallons per minute. So most of this apparently came from this fracture. Of course this hole was completed to a deeper depth, from what I remember, 250, 270.

MR. GERSTMAN: Dr. Michalski, you said the blow test at 199 yielded 68, 66 gallons per minute?

DR. MICHALSKI: Yes, just what the record says. But I'm using this as an

illustration. Really, if you look at the existing data, the aquifer performance -- bedrock aquifer performance is consistent with Heisig data of multi-units, multi-stack aquifer with bedding fracture, certain bedding fracture controlling the flow. So that would be my introduction to hydrogeology of the area.

If your Honor has the patience, I can continue with pumping tests.

ALJ WISSLER: I got lots of patience.

DR. MICHALSKI: So this is -- I have to use some theoretical backup for pumping tests. This is generic graph. It does not relate to our situation in any way; it is a generic. These are prototype plots of semilog time versus drawdown.

Standard way of performing pumping tests -- and I'm not talking about step drawdown tests, but real pumping tests, long-term pumping tests -- is to present your data for each well, pumping in this fashion.

So you have on the vertical axis, you
show drawdown. There's a difference between
original static well level and pumping level.

And on a horizontal scale, you have time in logarithmic scale -- 1, 10, 100, 1,000 minute. Then 10,000 minutes, and so on. This is -- I'm not going to go -- this is theoretical. This is -- because of certain theoretical model for which this situation is valid.

It is called Jacob, Cooper-Jacob, aquifer test analysis. And it assumes -- the assumption behind it is that the aquifer is like a slab, a constant thickness and very uniform, uniform aquifer of constant thickness.

ALJ WISSLER: Not stacked?

DR. MICHALSKI: Not stacked, slab. Single one. This is a porous media situation. It has nothing to do with bedrock. This is just for sand. But the aquifer is confined under the assumption. It means its water level is above the top of the slab. This is no dewatering during this situation. So this is how we have uniform aquifer, infinite constant thickness, and confined.

Now, the well fully penetrates this aquifer, and it is pumped at a constant rate all the time. When you start pumping, say

50 gallons a minute, you continue 50 gallons a minute over time.

Another very important assumption is here, is that the only source of water you pump from well comes from aquifer storage, comes from aquifer. There's no recharge. There's no recharge.

So under this condition, you would have this straight-line plot which has a theoretical drawdown curve, which is derived from a situation. When you do a pumping test and present your data in a drawdown time manner, using semi-log scale for time, your theoretical data should be a straight line going down, down, down. It will never end. Because, you know, the cone of depression would grow and grow and grow because of this assumption.

Reality is different. What we do here, we just plot the data and compare our response, our real pumping data with this theoretical curve. And if we see, for example here, upper drawdown -- with passage of time, drawdown tends to stabilize, goes up, like this upper curve on the drawing. We say some

recharge. We call it positive aquifer boundary; like recharge from a stream, from whatever. But there is some recharge, which causes our curve, our drawdown to be smaller, lower than predicted -- predicted theoretically for the case when storage is -- when aquifer storage was the only source of water pumped from the wells, there was no recharge. Straight line. No recharge.

Now, if we have a situation that our cone of depression -- our data drawdown goes faster with time than theoretical straight line takes, we say that there's some negative boundary, that's there's a limit of aquifer, physical limit.

In most cases -- because in most cases, we cannot tie it to particular situation without more thorough investigation. We can say that if you have situation that the drawdown curve with some recharge -- it's a net recharge, because you may have some boundaries, but there's a net positive recharge. If your ponds, it goes down -- you can have -- if any of you may have some recharge, the effect of boundary, negative

boundary, physical boundary is overpowered.

So this is all in aquifer, the basis for aquifer analysis. But there is countless possibilities which can explain different responses different than straight line. You have to investigate it on a site-specific basis, what can cause this.

This is only just purely from response -- positive, some recharge, negative boundary. That's all we can say. You have to do some more soil evaluation of your data to know the real reason.

ALJ WISSLER: The reason for recharge?

DR. MICHALSKI: For the observed ponds. So this is the theoretical stuff only.

Now, example, let's go to real data. This is for Rosenthal Well R1. It is a pumping test when only this well was pumped. It is important because there was no interference from two wells. Let's look at the response.

Okay, so initially, it was a straight line for about -- let's look at the time scale -- about I would say 200 minutes because it is 200 minutes of the first three hours,

then it went down. So you have like a bend here.

So first I would say it is indication of negative aquifer boundary, whatever it means, because without saying -- what Alpha did -- we don't know what would happen if you continue pumping for six months because it's likely, and I will tell you later on, that there are physical boundaries in this case, very strong one in this valley setting. So Alpha projects this straight line over 180-day period, which is on the next slide. (Indicating)

This is based on the response of the pumping well. They project what will happen to 180 feet. Of course they say that it is based on assumption, that there's no positive or negative boundaries -- which is highly questionable as you can see. (Indicating)

So this is those -- those wiggles indicates period of observation and this is extension. This is case -- not for the case I showed before, but this was a case of simultaneous testing of two wells, R1 and R2.

In the previous version, 122 combined

gallons of a minute; one was pumped at 57, the other at 71. So it was an older -- not the most recent -- pumping test.

What it says, it's a drawdown in the pumping well, would be how much projected drawdown at this pumping rate -- would be 165 feet, according to this projection, which is, if the water level in this well, if water level in this well was 25 minutes below the ground surface, which probably I'm correct, which means that the pumping level using this projection would be below that fractured 186, or pretty close to it.

MR. GERSTMAN: Could you explain that, Dr. Michalski.

DR. MICHALSKI: On this graph was a simultaneous testing results at the lower rate. The drawdown, projected drawdown after six months of pumping 180 days, would be 165. Even the fact that this is drawdown, and drawdown is the difference from pre-pumping water level and pumping level, and the initial water level was 25 feet below ground surface. That means that the pumping level at the time would be like 185. So it would be already at

this fracture.

The driller counts depth from the top -- from the well top, from the well head, while drawdown is the difference only between original level.

So, as I mentioned before, you can not claim now that you have 80 feet of available drawdown, because once you go deeper, you just dewater this fracture, you introduce air into this fracture, and the whole hydraulics would collapse.

Furthermore, note, during the recent April 2004 simultaneous pumping tests, drawdown in R2 after 1,000 minutes already reached 122 feet. So it was much higher. Because this situation, this projection is based on the previous test, and more recently drawdown stabilization tests in April, they got a much higher drawdown because it was already 122. Here, if you look after 1,000 minutes, on the left, drawdown of the pumping wells was less than 100, on the left scale.

In the next pumping tests, for which projection was provided, drawdown was already 122 feet. All it means is this fracture will

surely be dewatered.

MR. GERSTMAN: Can you repeat that, Dr. Michalski?

DR. MICHALSKI: That this primary fracture, water-bearing fracture, 186, would surely be dewatered within a couple of months, like two months.

What this is -- this projection is simple. I'm looking at the pumping well and I'm saying: What will happen to this well after six months of pumping. It's just prediction of drawdown for the pumping well itself. It's not prediction of what will happen outside some distance away. But if you say, A, on the flip side, you can create another type of drawdown, drawdown versus distance, which will utilize data from observation well, and I did this kind of drawing graph. (Indicating)

Can I have the next slide.

This is a distance drawdown analysis of data from two pumping tests conducted by us, and those results are two upper curves, or straight lines -- but in logarithmic scales they should be called curves. The bottom line

is a projection.

Now, you may see that at the uppermost curve or straight line, you have three points. This curve is based on three points. And they represent drawdown in Observation Well R1, R2 and Residential Well R4, which was located 1500 feet away from the pumping -- from the pumping. That was the only significant bedrock residential level that was observed.

(Indicating)

You can see that I can plot a line, best approximation. What does the line represent? It represents a position of the cone of depression in bedrock at the end of three-day pumping in Well R1 only when this well was pumped at 77 feet. As you can see, the cone of depression then would extend to what distance -- 1,000, the next vertical would be 2,000, the next 3,000. I'm looking at the intersection of the cone of depression with horizontal line of zero drawdown. When you have zero drawdown, there's no effect of pumping fast. (Indicating)

Now, based on this information, I calculated so-called hydraulic parameters of

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this aquifer.

MR. GERSTMAN: Dr. Michalski, before you proceed, maybe go over each of the lines that you plotted on the graph.

DR. MICHALSKI: I'm still at the top ones, where I have three points and I explained they represent observation well, wells which were not pumped while R1 was pumped; and these observation wells included R2, R3, which is the new closest point, and Residential Observation Well R4 which was located at a distance of approximately 1500 feet from the pumping well.

Based on this drawdown distance graph,

I could calculate aquifer parameters. So transmissivity of bulk, transmissivity was like 1,360 feet, which is good but not the greatest one, and storage coefficient, the storage was .0001. So it was a very low storage. Because storage is so low, cone of depression propagates over long distances.

So this is the whole reason for this. And this estimate of storage is probably optimistic. There was some recharge occurring into cone of depression at the time, and my

calculation does not account for that.

ALJ WISSLER: What are the units that storage is expressed in?

DR. MICHALSKI: It's dimensionalized. It has no dimension.

MR. GERSTMAN: The .0001, what's the unit?

DR. MICHALSKI: It's just a measure, it's just storage.

ALJ WISSLER: So it's a coefficient of storage?

DR. MICHALSKI: Yes, coefficient of storage. Coefficient of storage you can say for the entire thickness of the aquifer, which is not determined. So there's storage.

Now, the second -- they also perform a simultaneous pumping test when R1 and R2 are pumped, which left only two observation wells, R3 and the residential well. And the second intermediate line on the graph represents this test. You have only two points, because two wells were pumped, and the pumping is at zero.

As you can see, the drawdown when you pump two wells is steeper at the end of three-day pump. It's normal because you have

two wells, you have drawdown interference, more water, so it's steeper. If you extend it to zero drawdown line, it would go for what distance -- like 10 -- 2, 3 -- 4,000 feet at the end of three-day time. While the distance to Pine Hill wells was how much? Was like 7 or 5,000 feet. So you could not fill -- the Pine Hill Well could not feel the effect of pumping because it was some distance away, but if you pumped for longer distance, it would surely feel the effect. (Indicating)

The longest line represents my projection of drawdown or cone of depression after six months of pumping. Using the same assumptions they did, because they did it for one well for a pumping well. What I'm doing is for the drawdown. Same assumption, no positive, no negative boundaries.

So as you can see, the drawdown would extend for what distance, 10,000 feet, 20,000, 30,000 feet at this storage coefficient. So you get an astronomical number for that. So it would extend for many, many miles. It can not happen, it can not happen because aquifer will have boundaries, and I will discuss it in a moment. So therefore, you can expect negative response, some negative boundaries. The drawdown will be greater than predicted by this.

MR. GERSTMAN: Let me understand the projection that you made; is it theoretical cone of depression without the expression of any negative boundaries?

DR. MICHALSKI: This is theoretical based -- I'm using the same approach Alpha did. Alpha said: Okay, I have a drawdown in my pumping well, simultaneous drawdown of my pumping well. I will project what will be the drawdown after six months of pumping -- assuming that there's no positive and negative boundaries.

So assuming this theoretical relationship holds. I'm doing the same assumption, exactly, to come to this conclusion. You will get cone of depression extending in bedrock, which is no recharge, for astronomical distances, towards Kingston or whatever -- which obviously cannot happen because aquifer has boundaries, and I show the cross sections. (Indicating)

What it means is that this assumption is not valid. So you have to perform really long-term pumping to test the reality, because the reality is unique. There's no other situation like that. The only way of finding it is just by actual testing.

Another point. There's a claim that pumping at Rosenthal wells have no impact on Pine Hill -- is not justified because the pumping did not last long enough and this graph showed it.

By the way, at the end -- (Indicating)

ALJ WISSLER: Doctor, let me ask you this: When you say long-term pumping tests should be done, what does that mean?

DR. MICHALSKI: That means you need to pump for much longer than three days. You have to pump for at least a month or so to have an idea how things would develop.

ALJ WISSLER: Constantly?

DR. MICHALSKI: Constantly pumping, absolutely. Because if you don't keep constant rate, you are lost. You don't have theoretical guidance with -- you can do a lot

of claims -- which don't have basis.

ALJ WISSLER: Was that kind of pumping to your knowledge done by Pine Hill Water Company or anybody else? Has it ever been historically done, the kind of long-term pumping that you're talking about right now?

DR. MICHALSKI: There's a difference between pumping requirements for domestic well, well for a small hotel or whatever, and for two results which would pump significant, large quantities of water, and they're only a couple of miles away.

ALJ WISSLER: You're saying, in answer to my question, that even if it was done in Pine Hill, it wouldn't be relevant to this project?

DR. MICHALSKI: Yes, because you need to do it -- my evaluation shows that you can not get it, this quantity of water, and it would be like -- because groundwater resources are insufficient.

If you have -- like this firehouse, if you have a fire pond available -- and you can demonstrate, and this fire pond has certain storage limits, you can pump like

2,000 gallons a minute from this pond, but only for a short period of time to satisfy your needs. But if you do continual pumping, you would dry out the pump. There's some analog to this situation. (Indicating)

It's a fact that you can get water from -- that you can get this pumping rate for some period of time doesn't mean that you can extend it, particularize it. Geology is not in your favor. Maybe later on, there will be more evidence, I will present the cross sections which show that. (Indicating)

Another point of this drawdown distance is that if pumping effect extends for a mile, miles, drawdown effect, and you have more than one pumping center in the in-between, that drawdown cone of depression would coalesce where you have interference of drawdown. The actual drawdown will be larger than expected; so then calculated for individual wells. (Indicating)

And this is the next slide which tells the story -- but the basis for this statement is my previous slide and statement by Heisig, who actually says that pumping effects are

felt for mile up and down the valley over there. So it's not only based on extrapolation, there's physical evidence of that from the area. (Indicating)

The proposed pumping at Rosenthal wells would cause an extensive lowering of bedrock groundwater levels for miles. And the graph -- based on my graph, it says: "With 50 feet of drawdown within a half mile radius." So the water level -- actually the upper bedrock would be dewatered. It would no longer be confined. So any residential well in this region will be impacted.

Now, coalescing cones of depression -- coalescing means interference -- interfering cone of depression from the new pumping centers at Rosenthal wells, is 150 g.p.m. proposed, and Fleischmanns wells -- I notice this later -- is 250 g.p.m. So these are large numbers.

Together with existing centers, 40

g.p.m. at the ski area -- and the ski area
pumping would be concentrated in between
Fleischmanns because it's a lower part of the
resort between Pine Hill and Fleischmanns --

would result in extensive regional lowering of groundwater levels from Big Indian to Fleischmanns and beyond.

So there's no doubt about it. You would have a very extensive regional impact. Because the impact is regional, you have to use regional approach to analyze the hydrogeologic tests. You have to consider the entire area which will be potential impact. (Indicating)

Other groundwater users would be adversely impacted by resulting yield reduction. Even if your water level drops, you have a yield reduction. The same springs can be impacted because it's a leaky system. Higher pumping costs because you have lower water level, upwelling of saline water. If you pump, if you create drawdown, salt water creeps from that below, as my last slide showed, one of the last. And surface water would also be impacted.

And my next series of comments concentrate on surface water, impact to Birch Creek, how Birch Creek would be impacted by pumping.

ALJ WISSLER: Go back to the other

slide. This, again, all assumes that all of these, Fleischmanns, Ski Center, so on, they're all pulling from the same aquifer?

DR. MICHALSKI: From bedrock. They're pulling from bedrock, from different zones, and I will tell you -- initially, and I will give you example.

ALJ WISSLER: But all those zones are hydraulically connected?

DR. MICHALSKI: Connected because of leaking. So initially when you pump, only certain zone is pumped. But if you pump for long period of time, because of the leaking nature, you engage other water-bearing --

ALJ WISSLER: When you say leaking, you mean like hydraulically connected?

DR. MICHALSKI: Yes, physically -- and also open holes help you because there are some existing well bores which are never used, but they create cross-communication between those units, so you have your enhanced -- it helps you. And Heisig estimates 25 percent of flow can come from this leakage.

ALJ WISSLER: What is it that you are

basing your assumption that there is this hydraulic connection between these various areas? Do you understand what I'm asking?

DR. MICHALSKI: It's based on pumping test data, and one of them -- later on, I noted that my colleague prepares one of the graphs for responsive pumping wells which is very consistent with what I said. Can we defer this question to the end?

ALJ WISSLER: Yes.

DR. MICHALSKI: I appreciate your question, but it would be more clearer at the end.

MR. GERSTMAN: Dr. Michalski, the conclusion that Reynolds drew and Heisig drew, would you say, based upon your evaluation, are applicable here? They essentially supported the evaluation of the bedrock hydrogeology and the way you concluded it?

DR. MICHALSKI: Yes, absolutely, and I had more data to follow, but my next couple of slides concentrate on impact to Birch Creek for surface water volumes. But I felt that I need to go through this more heavy stuff to sell my point better later on.

Is it time for a break?

ALJ WISSLER: Fine. We'll take five minutes.

(11:01 - 11:18 A.M. - BRIEF RECESS TAKEN.)

ALJ WISSLER: Folks, if we could reconvene.

Dr. Michalski.

DR. MICHALSKI: Thank you, your Honor. I'm going to continue with impacts from surface water, in this case pumping at Rosenthal wells from Birch Creek.

So the proposed pumping at Rosenthal wells would reduce flow in Birch Creek through these two mechanisms. The first one is suppressing of intercepting bedrock groundwater contribution to the stream flow, and I'm talking about condition of low-flow situations. All my considerations are mostly for late summer for low-flow conditions; I'm not talking about spring situation. So groundwater contribution will be cut off by pumping, taken by pumping from bedrock.

I can refer you to the slides, one of the first showing low groundwater flow in a

valley setting which was from -- so this groundwater contribution would be taken by wells from bedrock.

The second mechanism would include pumping-induced water infiltration from the streambed and the saturated overburden. So this is the second mechanism. Not only is there the suppressing of bedrock contribution, and the second, its recharge from the creek and from overburden. The second one is evidenced from data from Observation Wells R1 and W2.

These two mechanisms define long-term sources of water pumped from the Rosenthal wells. This is always a question, the other side of the question. Not only that I pump; what are the sources of water you get to the

wells. If those wells are pumped indefinitely -- because the pumping rate proposed -- the pumping will be sustained all the time. It's not intermittent pumping that they propose, but it's constant pumping particular to -- so there's very little recovery allowed. So these are two sources of water. (Indicating)
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Now, evidence, next slide. What evidence do we have that pumping-induced flow across overburden occurs? This evidence comes from the latest recent April 2004 pumping test.

I can just -- I can refer you to a map which is in Exhibit 80A, which is slide -- page S-6, which depicts -- which is a map of the Pine Hill -- of the Rosenthal well area which identify location of all those points mentioned.

So evidence is like this: Water level in Residential Well 1, which was a shallow residential well, overburdened residential well, declined by 3.2 feet during the pumping. (Indicating)

We can go to the next slide. And it shows -- this is a page taken from Alpha reports which show data for Residential Well Number 1, which is a shallow residential well, a completed in consolidated deposit, approximately 50 feet deep and 675 feet away from R1.

As you can see, it says, "R1, R2, R3 pumps were on at 10 o'clock," and you can see

the decline over time. And at the end of this pumping test, declined by 3.24 feet due to pumping. And then it recovers. (Indicating)

Notice that this is an overburden well, so it is completed in unconsolidated deposit, an overburden deposit. Pumping is from the bedrock below, so pumping below is extensive cone of depression, causes water in the overburden to go down. So it indicates recharge. (Indicating)

The second evidence is response to one of the well points, which is well point -- it's a very shallow well, just couple of feet into water table, located near Birch Creek and R2. This well point declined by half a foot during the test. Two other well points did not respond. (Indicating)

Go to the next slide. So this is a page from Alpha's report. From Alpha, May 2004 report. And it shows depths to water on a vertical axis over the period -- depth to water in Birch Creek and in those well points. Of course the test was conducted in April, there was some rainfall before that. But as you can see, the triangles for Well Point

Number 1 show actually a response to the pumping. There's no doubt about it, that they responded. (Indicating)

If -- somebody may say: What is half-a-foot response, or three-and-a-half-foot response in overburden when you have 50 feet in bedrock? It's important because storage in bedrock, yield of bedrock is very small but overburden is large. Overburden can consolidate, it has a rate of like 10.1 or 10 percent, while overburden by bedrock has very low, as I tried to show. It's .0001. So a lot smaller response in overburden because of this idea can contribute a lot of water. So this is a normal response. (Indicating)

Let's go back. The same test caused 23 feet of drawdown in Residential Well 4, which is bedrock well located 1500 feet away. So we have like 23 feet of drawdown during this pumping. Overburden was less. (Indicating)

The response of residential well to this pumping test is included on my -- on 18, Exhibit 80A, page S-7. It clearly shows after R1, R2 and R3 pumps went on at 10 o'clock, the

first measurement taken after that show drawdown by a couple of feet. So they decline by 23 feet. So much more than predicted during the previous tests. This residential bedrock well is 1500 feet away from R1. (Indicating)

Can we go forward. So let's go with this evidence. So we definitely see --

bedrock well responded, no doubt about it, responded very fast, and very significantly. But some overburden well respond, like R1.

The observed pattern of the observation well responses through the pumping tests shows that overburden and bedrock had heterogeneities to control the flow. It's not uniform. It's the heterogeneities control the flow. This is very universal principle, it's not a discovery. And really, in this case, they do control, because certain overburden responses. (Indicating)

The variability of overburden is illustrated by cross-sections in Reynolds, in this report by Reynolds.

If I can refer to my supplemental pages, Exhibit 80A, page S-8 and S-9. So

these represent cross-sections from another area when there's significant amount of thickness of overburden. It's not site-specific because here we have very little overburden.

Those two sections are like probably a half mile away, so they're not far away. And you can see, they look completely different. Page S-8 and S-9, there are -- very lot changes in between. So it illustrates the degree of variability. (Indicating)

So when you pump over from bedrock, the bedrock develops cone of depression and it seeks and actually finds available pathway to hook up to the source of water. And you can not predict it, the way it will happen, because of this variability.

So that's why one well pump may respond, the other location does not. It's all differences in hydraulic conductivity, which controls this hookup to the water source. Because ultimately, the long-term water source to pumping must come from recharge, because there's no -- we know that its aquifer from theoretical that would go to

30,000 feet away. It's either recharge or nothing. (Indicating)

Now, significant recharge to the bedrock wells occurs at subcrops of conductive bedding fractures beneath Birch Creek thousands of feet downstream. This is an example of this bedrock heterogeneity, which probably relates to what I said at the beginning of my presentation about this bedrock structure. I tried to make a sketch which is as site-specific as possible. (Indicating)

So we have a plan view and section, vertical section. Plan view depicts Birch Creek bounded by bedrock valley, which is very narrow, 1500 feet or so. And I show location of Rosenthal well, and next is this pond, the snowmaking pond, and I created a cross-section on a vertical scale, elevation taken from the map, and I tried to keep horizontal scale at one inch to 1,000 feet, 2,000 feet.

So I really use USGS map to do this sketch. And as you can see, Birch Creek in sections goes down because of topography. The valley slopes to what is Indian Point.

(Indicating)

The difference, I read it from the map, was probably 100 feet per mile. So this would be the grade of Birch Creek, overall grade, and land surface in that area. So Birch Creek is shown. Residential Well R2 is shown, its true dimension, about 60 feet is cased off in the overburden. The overburden is this little stipple layer parallel to the ground surface line, which is like 40 feet or 50 feet thick. (Indicating)

And at a depth of 182 feet, I marked -- there was a fracture, as we established, and I assumed that this is a bedding fracture, consistent with all the data, and I assumed that this bedding dip at two degrees south to the west. Two degrees, which is very gentle. It is exaggerated here because the vertical scale is five times greater than horizontal. (Indicating)

So when you pump Well R2, and I indicated this cone of depression, your pumping level goes pretty close to this fracture, goes down. As a result, groundwater from the Birch Creek and overburden, which is

located more than to half a mile downstream, can be taken by this well, because this is the bedding fracture most productive. It is established.

So anything between that fracture and overburden can draw water into the well, as indicated by those blue wiggly lines. So this is an induced leakage. (Indicating)

What Alpha performs flow measurements for, water level measurement in the creek next to the pumping wells, and they discharge water from pumping, just like 200 feet away from pumping level, of course, you know, they did no measurements of impact of pumping some distance away.

So this is situation under pumping condition, if you -- in the pumping condition when water is drawn from the creek and the intake can be as far as here, like 2,000 -- half a mile downstream for this fracture -- so this whole area contributes to the flow. And flow is down the bedding fracture. Without -- prior to pumping, so if you discard this cone of depression, assumes there is no pumping, water level in this well Residential R2, is

25 feet, about 20 feet below the ground surface.

So it's actually below the creek level at this location. How can it happen? It can happen because of these connections. Because the well, open hole, through this transmissive fracture is connected to a creek at a much lower elevation, at a much lower elevation. So this is the controlling factor of the flow. (Indicating)

So under no pumping conditions, flow is a transmissive fracture can be towards the creek, and it's controlled there, the water level in the pumping -- but under the pumping, you can reverse this flow. I believe that the pumping record, they have demonstrated, and I have it in my supplemental page S-10. Here is a record of pumping tests, drawdown versus log of time for Well R2, when this well and R1 was pumped.

As you can see, the shape of this is -- you have a line going down indicating very little recharge, then the line goes in this direction up from a horizontal, indicating some recharge. This is a positive

boundary -- which is unexplained, somewhat weird. And then it goes down.

And this thing is evidence, this type of record for all plots prepared for this one, for all pumping tests, and notice that the recharge starts only when drawdown reaches certain value. When the drawdown is about like here, like 40 feet or so, this is important; because, as I mentioned, initial

flow across the well was downward to the
creek, and you have to create certain drawdown
to overcome, to reverse the flow.
So to me, this is an indication of
connection hookup to the stream along the
bedding fracture distance away. And of
course, if you look at this fracture, it's
geometric. It ends up, it goes to here.
(Indicating)
ALJ WISSLER: Let me understand.
Looking at S-10, if we come down to drawdown
in feet. If we get from 40 to about 60,
you're saying that at about 60 feet is where
that reversal occurs?
DR. MICHALSKI: About 80 feet.
ALJ WISSLER: Where it begins?

DR. MICHALSKI: Yeah.
ALJ WISSLER: Where the recharge
begins to occur.
DR. MICHALSKI: Yes. So -- because
you have to overcome initial head difference,
which is towards the stream, and resistance of
fracture to flow. But this fracture has a
limited extent, it gets up into the air, it's
no longer there. If you go down there, we can
not continue in down-dip directions for long
distances because the air pressure will keep
it closed. If you go laterally, it goes
beyond the valley under the mountains.
So it probably -- higher pressure, it
loses some of its transmissivity, or it goes

to the air or it goes to the next creek. But you can see that it has a limited extent. (Indicating)

You have negative boundary. The cone of depression cannot go all the way to Phoenicia. It can actually propagate. I drew a line at the bottom of the well, so it can go a large distance from the well. So this is initial boundary. If you pump the system for a long time --

ALJ WISSLER: And that limit is demonstrated in S-10, you're saying, at about 80 feet where it turns negative; is that what you said?

DR. MICHALSKI: It's negative, yes. That's a limit. You don't get as much benefit. It's a classic case of over-pumping. You can continue, but you have to pump at a slower, much lower rate. Such a rate which can be sustained by the rate of recharge. At this rate, you have classic case of over-pumping -- go crazy, and the system cannot deliver this amount of water.

The last thing is -- I did this because Applicant's claims that Birch Creek would not be impacted by the proposed pumping are based on improper interpretations of arguments on -- they say there's no impact, you can pump it without impact on the surface water whatsoever. They say because aquifer is confined. So because it is confined, it has no connection to the surface water, but the confinement ends. Each fracture is confined because it has bottom and top. If you envision the fractures by the model -- but it

has end.

So this argument is not like if you have clay on the top which prohibits infiltration and recharge. So this is a semi-confined system. Semi-confined means leaky. And the leakage can go both across, through this wiggly line, and at the sub-crop. (Indicating)

The second argument they made is that pre-pumping difference of water level in bedrock and overburden wells. They say, anyway, the water levels are downward. They say the water level in this pumping well are lower than the creek, so it can not happen. And I think that I explained that by means of this sketch, that it actually can happen.

In normal circumstances, if you're thinking the bedrock is a single aquifer system, you should not have downward flow other than pumping, because everything should go up. But if you have heterogeneities, like the flow in the bedrock is controlled by fractures, that interplay between heterogeneities and topography creates this effect. And now the situation can be impact of pump, of open boreholes, which can also act as a pump. So this argument that water level is lower doesn't -- it doesn't hold water.

It says the water quality data. This argument about water quality data for pumped water and the creek during the April 2004 test, they say: We measured the conductivity of water in the creek, and it was fresh, it has conductivity. No wonder, because it was rain before. It was a spring water time. That doesn't mean that the water you pump from well was spring water because it takes time for water from the creek actually to get to the well. (Indicating)

Second, your own -- Alpha's own data of surface water quality collected during dry season -- I mean October -- clearly show that water quality in the creek next to this tributary which is in the area of what I suggest to be intake for now was the same, roughly the same, was 400 ms, which is about the same -- or micro -- which is about the same as groundwater.

So they are comparing water quality in the spring during the time after a rainfall --

using this argument is also not valid. You should compare it against water quality at the dry season time.

Let me tell about this latest pumping test, simultaneous pumping of Wells R1, R2 with 149 g.p.m. which I did not address in my comments because the test was subsequent to those.

Crossroads claims that the test shows that a sustained yield of 149 g.p.m. was obtainable from these wells with drawdown stabilization and no adverse impacts on other groundwater users and surface water. This claim is based on inappropriate testing procedure that produced misleading results. The pumping was not conducted at a constant pumping rate, as required by the principles of aquifer analysis. This is a requirement.

To comment on that, the pumping rate was decreased during the test. This manipulation allowed for a partial recovery and apparent drawdown stabilization near the end of the 3-day test. I can refer you to plot for R1, which is the next slide. (Indicating)

This is Alpha records which shows drawdown versus time but this time is not logarithmic scale, it's just regular scale, just to show stabilization to satisfy certain criteria, which are not scientific.

Average flow rate initially was 78 gallons per minute. Then, because drawdown went down, down, down, because the water level went down, they decreased rate. When you decrease the pumping rate, you get recovery effect, partial recovery, which cannot continue indefinitely, so you have water level dropping so you can choke some of the flow again and continue it.

With this simple manipulation, I can demonstrate stabilization -- which is meaningless -- because what I'm using, I'm using recovery effect, partial recovery. Stabilization has to be demonstrated at the constant pumping rate.

I refer, Judge, to the first part I showed about the introduction to well hydraulic conditions for evaluating pumping tests. To come to any conclusion whether you can test aquifer boundaries, you have to

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maintain a constant rate.

MR. GERSTMAN: Could you explain further the recovery effect.

DR. MICHALSKI: That's in the next slide. Now, had this test continued for months, the pumping rate -- I'm talking now about constant drawdown tests -- had this test continued for months, the pumping rate would have been needed to cut back more and more to keep the drawdown stabilized.

So ultimately you do this procedure for six months, you would know probably how much water you would get. So that would be the test, if you start with drawdown stabilization.

Another point which I should say, slow

and incomplete recovery of water levels after the April 2004 test, and all other tests, indicates insufficient recharge to the bedrock wells even at the wettest time of the year -- because the test was conducted in April after it was .9-inch of rain during the recovery.
So recovery, water level -- after pumping stopped, water level went up for five days, and you didn't have complete recovery,

so it didn't bounce back to recovery level.
ALJ WISSLER: It looks like 87 and a half percent?
DR. MICHALSKI: Yes. But theoretically, if you use my model of slab, this infinite theoretical model, and the only source of water was storage from this stab, the recovery should occur within the same time as pumping did. If you pump three days, you need three days to get complete recovery. There was no recharge, just theoretically basis because you require recharge. It's theoretical, so it assumes there was --
ALJ WISSLER: If you pump --
DR. MICHALSKI: Anything longer than that, tells you that you've mined your water, you just mined, you just take water from storage, more than it's recovered, and it tells you about the possible presence of negative boundaries on aquifer boundaries, which are expected based on the physics of the process.

If you have dipping system, it has to end down-dip, it has to have up-dip. The only extension is laterally, but it also cannot

last indefinitely, so we surely have boundary.

In every pumping test, that water level did not bounce back for much longer time. You would completely dewater significant portion of aquifer if you continue with this pumping. And if you have coalescent cone of depression from other pumps -- because you over-pump this aquifer. This aquifer cannot deliver as much as you want. And we don't know how much it can deliver. But whatever it can deliver, it comes out from the little stream, by reduction of flow to the stream or direct recharge.

Observation. Let's look at the system purely from a surface water measurement.

MR. GERSTMAN: Judge, did you have a question?

ALJ WISSLER: No.

DR. MICHALSKI: Different view on the system from measurements performed -- stream flow measurements performed by Crossroads.

What is it showing? This is baseflow. Baseflow is flow -- typical characteristic of the water. Rapid, flashy runoff is typical of the site of Birch Creek. Daily flow in Birch

Creek can increase 1,000 times in one day after significant rainfall, to drop by two order of magnitude in ten days.

So actually this data is from Indian Point from USGS. So in the case of Birch Creek, it's probably less. So it takes you -- after seven days or a week -- you don't have effect of any recharge from rainfall, you rely on baseflow.

Baseflow, which is the discharge that is exceeded 90 percent of the time -- this is the definition -- it is based on stream flow measure -- is a measure of groundwater contribution to a stream.

For a typical -- now I'm jumping to adjacent levels -- for a typical small Catskill mountain stream, the summer baseflow, the water coming through during the summer makes only less than 2.5 percent of the total runoff and less than 2 percent of the total rainfall. So it tells you really how small this baseflow is, because of the nature of the rocks. They're not good groundwater resources.

And particularly, for situations when

your overburden doesn't have any stratified drift -- I mean stratified -- good aquifer material -- the above shows how small the baseflow, the contribution from groundwater is in this specific setting.

During prolonged dry weather spells, the creek and proposed water supply wells would compete for the same limited groundwater resource. So if there's no other water from the creek, after seven days -- a week after a significant rainfall recharge event, the creek relies on its baseflow.

And if you continue pumping -- because you pump all the time -- remember the purpose is to pump continuous -- you would just take this base. Recharge estimates from annualized water budget and generic soil types are misleading in that regard.

If you wonder about groundwater resources in this area, you should not talk about soil types, about this -- because those things relate to soil aspect, to maybe perc tests, to need for water -- but they are not equivalent to groundwater sources, to groundwater contribution because the critical

period is late summer, early fall, when actually the recharge is fairly small, and this is from stream -- for streamflow and for groundwater. And also, there is a snowmaking aspect this year.

Now, streamflow measurements. I'm just -- I'm referring to Table 1A of Exhibit G, and actually are included in my supplemental pages. The last three pages relate to this document.

Page S-11 show location of streamflow measurement points. And the next two pages show one table in the split format I was provided. This is the source for this conclusion. I just checked the data. They are very weird -- if not sometimes interesting.

The lower segment of Crystal Spring from above its confluence with Birch Creek, loses some of its flow, 224 g.p.m. to 364 g.p.m. So this is a measurement of the -- it's a losing stream, the lower segment. The water is lost. It is not gaining as you should have, but it is actually losing water. One of the -- and this was amount of the loss,

just by simple subtraction of that.

I hypothesize that subsurface water transfer to the Emory Creek via transmissive fractures and open bedrock holes may account for much of this loss. So there's -- because we don't think see this thing very much -- pumping at Fleischmanns wells would exacerbate the loss because the natural dips. Pine Hill area, the dip is towards Fleischmanns. And if you do some geometric projection, you can see that Belleayre wells and some of the Fleischmanns intercept the same fracture. Now, this is for Crystal Spring section. (Indicating)

Now, another data is for Birch Creek. There were two measurement points; one was just below the confluence with Crystal Spring, and the second was USGS gauging station. So when water -- and the conclusion is: At times when water is not diverted for snowmaking -- and this snowmaking pond has an extreme effect on the creek because it truly puts the streams haywire -- Birch Creek is barely gaining flow within a two-mile segment below its confluence with Crystal Spring and Indian Point.

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So the contribution of groundwater is not great. This low groundwater contribution is attributed to poorer groundwater resources of the area and to effect of open bedrock holes, short-circuiting flow to those conductive bedding fractures that intersect streambed downstream at lower elevations.

So some of this may not be measured by this. This is a look at groundwater resources from point of your surface water measurements, and it's not very promising in terms of water resources. (Indicating)

Now, this is -- slide is taken from Heath, from an old, very good primer on groundwater. So it shows how a well can be contaminated by two mechanisms. One would be like contaminants coming from above into cone of depression. This is the farms or whatever.

And the other one is by upconing of salty water from below. And we know that this case is applicable to that area because high risk for salt upcone in these areas indicated that. Data from the Batavia Creek, Heisig, and it clearly says that it's about 2, 300 feet below, you have saline water. And some

of them has salinity close to seawater.

He just characterizes probably so-called connate water, which is water sitting there from the beginning of time -- but it's really established that there is saline water at the bottom of that in this zone which is not very active for flow. It is there because it doesn't participate in this shallow groundwater flow. (Indicating)

The second site-specific data, in one of the Fleischmanns wells, high conductivity value, it is 900 ms per centimeter -- was recorded in discharge from Well 1 twice. This conductivity translate to total dissolved solid over 500 milligrams per liter, because it's really -- and I was surprised to check.

The first thing I'm looking at is to check for some water quality data from the lab. What is the total dissolved solids? It reports 50. So 10 times less than I would expect. Something like that.

What is surprising, I just look at the top of this page, and instead of saying Well 1, it says Well Catch Basin 1, Well 1 Catch Basin -- something like that.

So it's really -- there is here a big difference in simple data which do not square up, and they should, because if you have no -- so this is real. And normally this upconing of creeping of saline water would be most pronounced under the valley setting. You have a valley, so this a plan you would expect.

So these things should be addressed by the Applicant, because if you don't do it, once the saline water creeps up, you will not be able to get rid of it easy.

Monitoring aspect -- because there's a proposal to use some of the wells for monitoring. You can not use very deep bedrock wells for monitoring of nitrates and pesticides because of this hydraulics, you would not get any results. So you need to use -- specifically install a well which would monitor the impact, consistent with hydrogeology.

The second thing, monitoring for pumping-induced salinity needs to be included, starting with a baseline salinity assessment. That's a starting point.

Spring monitoring. Spring monitoring requires first a realistic hydrogeologic assessment of subsurface flow pathways at seeps and streams. Defining flow contributing areas to springs based clearly on topography features alone is inadequate.

And here we have -- how weird the situation is -- example of losing stream below

Marlowe Mansion. I was there once at this field trip, and we clearly noticed that there was a spring, and it was no more. I noticed there was some sandstone bedding exposed in this area not far away.

But really, if you want to monitor spring recharge area, you have to define hydrogeology of the site in real terms. You have to take structural effect into account, you have to determine site specifics, you need to identify those springs elevations and seepages when they occur. Then, only then, you can establish realistic monitoring point, otherwise you may have a very weird response. Certainly if you don't have water in a well, you don't know if those things are connected or not.

That's the end. If I could go back to the first page.

MR. GERSTMAN: Dr. Michalski, would you again start off with your summary of your conclusions. If you would review those and refer to the offer of proof that we made to support those conclusions.

DR. MICHALSKI: So the first one is about pumping rates. The proposed pumping rates from Rosenthal supply wells, and currently based on this, cannot be sustainable in the long run. The long run means couple of months.

Long-term stabilization of pumping

groundwater levels is not likely at such rates. You cannot. If you pump like this, you cannot get stabilization. So you would create a huge drawdown, but you cannot long-term get what they suggest because the resources are not there.

The pumping from Rosenthal wells would subtract flow to Birch Creek basin so this is an impact of pumping to surface water. And I discussed the two mechanisms by which this can occur; suppression of baseflow, groundwater

contribution; and the second, direct leakage from overburden from the stream.

Now, extensive lowering of bedrock groundwater levels over a large area will adversely impact other groundwater users, so there's no doubt that you have to take into account the cumulative impacts of pumping because of the extent of the cone of depression from individuals wells.

So the cumulative impacts from interference from new large withdrawals from existing one like Pine Hill, and possible future one, which this development may induce, needs to be considered as they all compete for a limited groundwater resource. There's no groundwater there to be available during that critical period of time. There's plenty of water in the spring, there's a lot of recharge but it's gone. DEC people know what to do in those situations.

Additional hydrogeologic information and data are necessary for the entire area from Indian Point to Fleischmanns in order to adequately assess impacts on groundwater resources, and the impact of pumping and

develop reliable monitoring of water quality changes.

In this additional hydrogeologic assessment, we're required to use different tools, specifically borehole geophysics, temperature conductivity data, logging for filing -- you need to do flow meter measurements of existing wells. Downhole TV caliber.

So this is the basic logs which are informative regarding flow in the existing wells, distribution of transmissive zones. And then you have to gather this information and develop a site-specific -- a model of the area, as I tried to do for Well Number 2, just based on --

ALJ WISSLER: Could you go through that list again a little more slowly about the hydrogeologic information data that needs to be collected.

DR. MICHALSKI: Yes, additional.

ALJ WISSLER: What?

DR. MICHALSKI: For the entire area.

ALJ WISSLER: What specifically do you think should be done?

DR. MICHALSKI: You need to do borehole geophysics. It is standard -- not standard -- borehole geophysics in existing wells. This borehole geophysics would include, first, downhole TV, or maybe acoustic televiewer, because it also gives you idea about the crookedness of the holes. But you need to have a peek into the well. There's tools available to do that.

Second, you need to do -- to determine which of those fractures -- and you will see a number of them -- really conduct water, are transmissive. So temperature conductivity provided, which is not expensive, will give you partial answer to that, and flow meter logging, just measuring of cross volumes would give you more.

ALJ WISSLER: None of that was done, you're saying, here?

DR. MICHALSKI: Pardon?

ALJ WISSLER: None of that was done?

DR. MICHALSKI: None of that was done. Even the simple temperature conductivity logging. So with this, and certain conceptual models in mind, you can create cross sections,

and then when you do a pumping test, you can argue whether the response you observed is due to this factor or this factor. You simply are very close to reality.

It's not a critique of their -- everybody goes along the lines of least resistance, so it's more like a statement of what needs to be done.

MR. GERSTMAN: Dr. Michalski, we had a site visit to the proposed Wildacres site. Would you relate to us some of your observations from that field trip that relate to your analysis here today.

DR. MICHALSKI: The most important one about losing stream, I just mentioned. We had -- I remember some kind of springs which were coming from high elevation in bedrock in an area which looked like a little circular depression, and then they created the wetland. And this wetland -- or whatever it was in piping drawn to -- it reappears in the stream, surface stream. And below Marlowe mansion, this stream was gone at some point. What I know. Where it goes is important. What happens to it is important.

What I should mention is, also, that wetlands, high-level wetlands, are related to the groundwater source. I don't know whether the wetland that existed next to the Rosenthal well will not be trained in the long run. The pumping, three days, is not sufficient to determine impact to wetlands. But these are some core issues related to groundwater and can be significant.

MR. GERSTMAN: May I have a moment?

ALJ WISSLER: Yes.

(BRIEF PAUSE.)

DR. MICHALSKI: It's regarding the impact of the snowmaking pond. The snowmaking pond acts as a kind of buffer reservoir to take water when it is -- when there is excess of it, and unfortunately most this requirement for -- it is empty starting from late November, and it needs to be replenished during that time, some of it, and we see a record in Alpha measurement that can only be explained by diversion of water.

In short, during low flow period in Birch Creek, snowmaking and groundwater compete for the same basin, or clash for the

same basin, which is well-known how to reconcile those things.

When you have a lot of water in the spring and it's 50 or 55, it's relevant. Where you have critical periods, late summer, you don't have water, so this is relevant.

MR. GERSTMAN: To the extent that there was a proposal to increase snowmaking at Belleayre Mountain Ski Center to support an expansion, would those activities -- would you say that would further exacerbate the stress on the availability of water supply for other uses?

DR. MICHALSKI: Yes, if this occurred -- if this took place any time during late summer through -- it's a critical time of the year.

MR. GERSTMAN: Thank you, Dr. Michalski.

Judge, can we go off the record for a second.

ALJ WISSLER: Yes.

(BRIEF RECESS TAKEN.)

("OBSERVATION WELL DRAWDOWN ASSOCIATED WITH STATION ROAD WELL AQUIFER

TEST" RECEIVED AND MARKED AS CPC EXHIBIT NO. 84, THIS DATE.)

ALJ WISSLER: Mr. Gerstman.

MR. GERSTMAN: Your Honor, we will be referring to various exhibits which have already been introduced, including CPC 61, 62 and 63. We will also be referring to exhibits we introduced today, CPC 82 and 82A, and the partial testimony of Mr. Rubin, CPC 81. We also introduced just now CPC 84.

Judge, I would like to introduce you to Mr. Paul Rubin.

Mr. Rubin, would you tell the Judge about your education and experience, please.

MR. RUBIN: I'm a geologist, hydrologist. I have a Master's Degree in geology from the State University of New York at New Paltz. I have worked since my graduation in 1981 to the present in a number of different hydrogeologic and hydrologic.

MR. RUZOW: Paul, could you keep your

voice up.

MR. RUBIN: I've worked in a number of different locations as a hydrologist or hydrogeologist/geologist at times since my

graduation from New Paltz College.

Initially I worked with the Stone & Webster Engineering Corporation where I did hydrogeologic investigations. Texas Panhandle -- siting of a nuclear waste repository, doing subsurface investigations for a nuclear waste repository, predominantly deep basin groundwater testing pump tests.

After that, I went to work for the Attorney General's Office in Albany, Environmental Protection Bureau, doing a lot of litigation work that's important of the law office, places like Love Canal and hazardous waste sites, I had a significant involvement in at that time. That was for about eight and a half years.

After that I went down to Oak Ridge, Tennessee where I worked as a research scientist at the Oak Ridge National Laboratory, mainly doing hydrogeologic contaminant transport investigations, predominantly with karst, cave-bearing aquifers, studies down there. I was there about a year and a half, submitted my resume on the exact date.

After that I came to work for the New York City Water Supply right up here at their Shokan office where I was actively involved in surface hydrology work, both water quality analysis and a lot of geologic mapping, glacial sediments throughout this area, including the Berkshire Creek area as well, all as part of my New York City Department of Environmental Protection work.

Subsequent to that -- right now I teach full-time at a community college in the area, and I also run a small consulting firm where I do environmental analyses, Geographic Information System map work, that type of hydrologic assessments.

So at this time I do that part-time, but as of January, I'll be doing that full-time.

MR. GERSTMAN: Mr. Rubin, have you had a chance to review Crossroads Ventures' Draft Environment Impact Statement concerning its application for water supply for both Big Indian and Wildacres?

MR. RUBIN: I have.

MR. GERSTMAN: Let me clarify on the

record something that Dr. Michalski had referred to. When he was referring to Indian Point, the reference was to Big Indian.

ALJ WISSLER: To Big Indian.

MR. GERSTMAN: Does that include the original and revised water supply applications that were submitted for Big Indian and the Wildacres Resort?

MR. RUBIN: It does.

MR. GERSTMAN: What conclusions did you come to with respect to those applications and the supporting documentation?

MR. RUBIN: The broad conclusion is that based on the data that's available to us, there's insufficient evidence to indicate we would have sufficient water supply for the Big Indian Resort, and furthermore, the basis for the conclusion -- and I'll go into this in more detail -- hinges on a draft Department of Health guidance document to take a look at what is considered a stable state or equilibrium-type condition in an aquifer. And we'll look at some graphics to identify whether that's a reasonable, or whether that draft guidance needs to be updated with

hydrologic input.

MR. GERSTMAN: You listened to Dr. Michalski's offer of proof earlier today?

MR. RUBIN: I did.

MR. GERSTMAN: Do you agree with Dr. Michalski's offer of proof?

MR. RUBIN: I do. It was excellent.

MR. GERSTMAN: Mr. Rubin, would you proceed to explain to the Judge the basis of your concerns about the adequacy of the water supply and the contradictions that were found in the application submitted by Crossroads Ventures concerning the availability of water supply to support the project.

MR. RUBIN: I will. I submitted a -- testimony, just a partial draft of some of the issues, I'm going to go through that and some of the graphs that go with it so we can understand what I'm talking about here.

MR. GERSTMAN: That's introduced as CPC Exhibit 81.

MR. RUBIN: Hydrogeologic evaluation of well test data indicates that the planned water source for the Big Indian Plateau development may not be adequate. Rosenthal

wells R1, R2 and R3 are planned sources of water for the potable and irrigation water supply for the Big Indian Plateau Development.

We can see these on Exhibit 61 which was introduced into evidence or marked as -- this graph is a Geographic Information System map that portrays the reasonably close locations of the three Rosenthal wells, and it also shows on there the link hydrologically between R1 and Residential Well 1 and Residential Well 4, which as we have seen in the record from Dr. Michalski's discussion, that there was some limited observation well testing done of these wells, but not a full transducer-type assessment that we might hope for.

With that figure in hand -- I should

say these wells are approved by the New York State Department of Health and the Ulster County Department of Health as having adequate yield.

This approval hinges on the concept that a combined well test of at least 72 hours was conducted and continued until all three wells demonstrated a stabilized drawdown for

at least six hours. This is detailed in a letter by John M. Dunn, P.E., from the New York State Department of Health of March 23, 2004 to Alexander Ciesluk, Jr. of the New York State Region 3 office in New Paltz.

Specifically Mr. Dunn's letter --

ALJ WISSLER: Is that a separate exhibit that we have?

MR. RUBIN: I believe that's in the record.

MR. GERSTMAN: We'll give you the reference, Judge.

MR. RUBIN: Specifically this letter states -- this is critical, their understanding of whether there's adequate water supply for the project: New York State Department of Health Draft Standards for Water Wells defines the stabilized water lever as, "The level of water in a well that has achieved equilibrium during a period of constant rate withdrawal of groundwater, i.e., stabilized drawdown."

The draft standards further state:
"The stabilized pumping water level shall not fluctuate more than plus or minus 0.5 foot for

each 100 feet of water in the well, and plotted measurement shall not decrease during the constant flow test period."

This definition allows for the water level to fluctuate a reasonable amount above or below the stabilized pumping level. It does not allow for the water level to continue dropping during the stabilization period. So a critical element of this is that the water level -- when things are stabilized, should not continue to drop, which we'll examine as we go on here.

It's important to point out that the Rosenthal well test was not conducted throughout at a constant withdrawal rate, as pointed out previously by Dr. Michalski here, thus negating the stated intent of the New York State Department of Health draft standards for water wells.

Similarly, because a constant water withdrawal rate was not maintained throughout the drawdown test, it is not possible to assess that equilibrium conditions were met.

Equilibrium conditions occur when the rate of recharge within the area of pumping

influence equals the rate of pumping, thus resulting in stabilized water levels throughout the area of influence.

Because observation wells were not used continuously -- they were used but they were not continuously monitored throughout the well pumping test -- it is not possible to fully assess how far outward the cone of depression extended during the pumping test, whether aquifer boundary conditions would have been encountered, or any measure of the potential quantity of groundwater available in the aquifer. Those observation wells that were monitored partially were few and areally limited.

Assessment of aquifer equilibrium conditions is routinely assessed by hydrogeologists via the examination of a semi-logarithmic time drawdown plot of the drawdown data, preferably the drawdown data as observed in an observation well versus a pumping well.

The semi-logarithmic plots of time drawdown data are the standard means of portraying aquifer drawdown when assessing

equilibrium conditions and can be extended to predict drawdown for a period of continuous pumping longer than the test itself.

Plenty of references use this technology or methodology, Driscoll, Groundwater and Wells, 1986, is one common source of information of many. These semi-log plots are also used for calculating aquifer constants.

The Applicant elected, instead of using a semi-logarithmic plot, to only present drawdown data in a arithmetic graphing format versus standard graphical procedures.

No observation wells were continuously monitored throughout the well test, although partially; thus, it's not possible to assess whether equilibrium conditions would ultimately have been reached had the well test been continued for a longer period of time.

Similarly, the Applicant's failure to use observation wells, with continuously recorded drawdown data, precludes the full analysis of the Coefficient of Storage or storativity, which is an aquifer parameter that assesses the volume of water an aquifer

releases from or takes into storage per unit surface area of the aquifer per unit change in head.

Storativity is important in assessing how much water is available for use in the aquifer of a reasonable water supply for this project. Sound hydrogeologic assessment of water availability requires determination of this coefficient of storativity. Thus, it was not fully possible because observation wells were not comprehensively incorporated into the testing procedure with full data collection.

My colleague, Dr. Michalski, had

previously presented his calculated S value of .001 or less that indicates very little aquifer storage.

So the key here is, in order for us to understand whether there's adequate water quantity available, we need to be able to access common aquifer coefficients, and storativity is one of these coefficients. Although we can do it crudely, ideally we like a full, comprehensive set of observation well drawdown data from an aerially wide area.

As a hydrogeologist, I would not be

comfortable stating that sufficient water quantity was available without comprehensive assessment and evaluation of storativity and transmissivity that are routinely assessed in water supply studies.

Neither were determined by the Applicant. Thus, while test results are intended to indicate that the well will produce the yield flow rate, in other words, the minimum sustained yield for a prolonged period -- that is stated on page 2 of 6 of the New York State Department of Health Bureau of Water Supply Protection, Technical Guidance for Designers and Developers of Realty Subdivisions -- once the drawdown data is correctly plotted, it is clear that equilibrium conditions were not achieved; and two, the well test at each new discharge rate was terminated shortly after the data indicates the aquifer was not able to readily keep up with the pumping rate. We see this in Figure 82, and in the steep slopes, semi-log slopes shown on 82A.

Why don't we turn to those figures for a minute. First, looking at Figure 82, we

have this in front of us. This is a plot, semi-logarithmic depiction of the drawdown portion of Well R1's testing during the aquifer well test that we had here, and it shows a very steeply descending drawdown curve, which would be projected with the blue dash line on the figure.

We see that that straight alignment of the data points of drawdown indicate little or no aquifer recharge is going on. We could typically use a graph like this to have a reasonable prediction of how much the drawdown would be after a certain period of time in the aquifer.

Remember, we heard -- the Department of Health has this draft guidance document out there. What the Department of Health wants us to do is take a look -- or at least have 72 hours of pumping test work done, and then to reach a water level that is reasonably consistent -- doesn't fluctuate substantially -- over a six-hour time period.

Now, if you were to follow that guidance, you could come up with plots that would indicate there was inadequate water

supply, and certainly what ended up being approved by the New York State Department of Health.

Perhaps we should look at that for a second. In the Belleayre Resort report, there are three specific graphs that show this. One of them is entitled, "Belleayre Resort at Catskill Park Simultaneous Pumping Tests for Wells R1, R2 and R3." And what it shows --

MR. GERSTMAN: Before you start to talk about it, where can the Judge find that in the application or the DEIS?

MS. BAKNER: Applicant's Exhibit 51B, which is Conceptual Design Report, Big Indian Plateau Water Supply Treatment and Distribution. And the letter from John Dunn from the New York State Department of Health dated March 23, 2004 is also included in that report immediately after the protocol submitted by Alpha Geoscience dated March 11, 2004. The table should be in the front, but we need the table numbers to find the page number.

MR. RUBIN: Appendix F titled, "Draw-down and Stabilization Plots." The

second page of Appendix F, we see the first arithmetic plot of Well R1 that shows a 0.995-foot fluctuation for the final six hours of pumping in Well R1.

Similarly, on pages 4 and 6, we see similar plots for the final six hours of pumping for Well R2 and Well R3. Well 2, R2, shows an overall fluctuation in the last six hours of pumping of 1.264 feet, and Well R3 shows a fluctuation in the final six hours of pumping of 1.634 feet.

As part of the procedure that was agreed upon between the Department of Health and the Applicant, specifically Alpha Geoscience in part, they bought into this minor fluctuation of .05 per 100 feet of well.

And I would like to address the fact that that was a draft guidance document, and it really is not in keeping with the sound hydrogeologic principles that would be put forth by the National Groundwater Association.

And I'm going to show us graphically why this is important to our assessment, and that these graphs that we just talked about, the roughly one-foot fluctuation water table

for the last six hours of the test, are not really representative of what's going on and what is.

Looking at the two plots, start with Exhibit 82. Exhibit 82 shows the comprehensive test data from Well R1. We see on it that using a semi-log plot versus an arithmetic plot, that we have a steady decrease in the amount of water that's available to the aquifer; in other words, we are pumping out more water faster than the aquifer can continuously replenish it. Then we see when they decided to reduce the discharge in an effort to reach some sort of stabilized condition, also indicated on Exhibit 82.

To make life easier, what I have done is I've blown up that portion of the test seen on Exhibit 82, we see it now on Exhibit 82A. It's just a little piece of it, so we can see it in detail.

Looking at this exhibit, what we see is what really happens when we turn off the higher flow rate in an aquifer is we're in the condition where the cone of pumping influence

is extended laterally outward for some great distance laterally. It may not be a circular cone of depression because, in fact, we're in a fractured bedrock situation, so it may be anisotropic or unequal in different directions.

And that's why we see evidence for a mile away, different impacts from fracture input, secondary porosity of the aquifer. So things aren't equal in all directions but they are drawing things down.

What happens? No matter what the actual shape of that cone of depression is, once we reduce the flow from about

78.5 gallons per minute as seen in the left portion of Exhibit 82A, what we would expect to happen is the water from the aquifer is coming back in at a greater rate than it could before because we've decreased the pumping rate.

So we can break out what happens in the aquifer as it starts to -- attempts to recover with the reduced pumping rate into three sections. That's what I have done in this plot here.

The first section we call the initial water level, or aquifer rebound, that occurs with a decreased pumping rate. And that's where we see the data points go up in elevation on this graph, the drawdown decreases. That's what's happening, is the aquifer is rebounding. Water is coming back in because suddenly we're pumping at a reduced rate.

Then we have a very temporary period of time where the data shows we have very temporary stabilization of our data points, and then in both, reduction and flow rates of 70 gallons per minute, and flow rate of 63 gallons per minute.

We take a look at the data up close -- a pretty nice set of data -- we see that, again, just as in our initial flow rate of 78.5 gallons a minute, what we see is that the aquifer is starting to have renewed drawdown.

If you look at my extensions, if I were to project roughly how the flow would continue with time, using a semi-logarithmic plot, you would see, in fact, we don't have a stable condition here at all. What we have is

renewed reduction in our discharge, groundwater level is going to go down through time. It may follow my line of best fit here or it may become even steeper, for all we know. And the only way we would know this of course would be to run the test for a lot longer period of time --

Here we put that fact that the one-foot fluctuation that we saw in the Applicant's three graphs really shouldn't be bounded very narrowly on an arithmetic plot, that we can break it down into the actual mechanics of what's going on within the aquifer. Let's discuss that in a little more detail.

MR. GERSTMAN: Mr. Rubin, you're reiterating, I believe, what Dr. Michalski has already talked about in terms of this recovery effect. That is that the physics of the situation artificially heightens or artificially suggests that there's greater recharge or greater availability of water than there would otherwise be just because of this recovery effect?

MR. RUBIN: That's right. Let me go

on and explain this a little further.
Mr. Dunn's letter further clarifies that the New York State Department of Health's definition of a stabilized pumping level does not allow for the water level to continue dropping during the stabilization period. I suspect that the reason the New York State Department of Health acknowledges that their standards are "draft" is because it needs detailed refinement when it comes to the hydrogeologic assessment of "stabilized pumping level" or equilibrium conditions.

In fact, six hours of water level data collected after reducing the discharge of a well is not likely to be able to demonstrate any kind of stabilization or equilibrium conditions.

The Applicant has carefully and readily worked to take advantage of the draft nature of the New York State Department of Health draft standards even though final sign-off, and probably evaluation, has not occurred.

These draft standards, in their current form, are not based on a rigorous

(WATER SUPPLY ISSUE)

hydrogeologic foundation. They require significant modification and input from hydrogeologists. No project water supply should be approved based upon an incomplete draft standard.

The New York State Department of Health and Ulster County Department of Health well test procedure used is very unconventional and has some serious flaws. I'll detail some of the biggest problems.

First, the most serious flaw with this methodology. When you pump at a high rate and then reduce the rate to get a steady state condition, it might seem that this is a valid worst-case approach because the well is being stressed more than it would if only the smaller pumping rate had been used all along. However, when you decrease the pumping rate, the water level rebounds a little bit, as we saw in Figure 82A, and takes a while to stabilize. After it has this initial stabilization, then it begins to drop again.

For example: If you pump at one cubic foot per second for 72 hours and then cut the discharge to half of that, say 0.5 cubic feet

per second, the drawdown curve will rise, gradually level off and then start dropping about half the original rate. But in the transition between the two stable slopes, there's an extended period when there's very little fluctuation in water level when you could easily meet the New York State Department of Health requirements of less than 0.5-foot fluctuation. This is exactly the situation we have seen in looking at the three graphs out of the Applicant's report.

But the well has not yet begun to respond in our example, to the 0.5 cubic-feet-per-second pumping rate, and that test would be invalid. This situation is directly visible in the Well R1 semi-log plot, Exhibit 82A we're looking at here.

The reduced discharge simply has not had adequate time to demonstrate the steeply dropping drawdown data that would more fully resemble the discharge, Q = 78.5 g.p.m. curve. Yet, by the time of culmination of both the reduced discharge rates, both the 70 gallons per-minute and the 63 gallons per-minute rates, the precipitous drop in water levels

had already begun. We can see that both in Exhibits 82 and Exhibit 82A.

The short-term duration of the Belleayre Well test at the two reduced pumping rates fails to provide sufficient data to reliably define the slope and position of the time-drawdown graph needed to predict drawdown at different time intervals.

In other words, the length of the lower discharge portions of the well test do not reasonably meet the intent of testing or stressing the aquifer at the new lowered pumping rate since this test was not actually conducted at a stabilized constant discharge rate.

We heard previously, previous to my

testimony, the same thing. If you're going to analyze this information, we want a constant rate test. It's a standard procedure in this type of investigation.

So this straight alignment of drawdown points indicates little or no aquifer recharge. Thus, the six-hour plus or minus, 0.5-foot "acceptable" water level fluctuation currently in the New York State Department of

Health draft standard requires significant revision, as it will often result in a completely erroneous well yield figure, as happened here.

This is a major flaw in the current draft of New York State Department of Health standard, and can cause a serious over-estimation of the well capacity, or what we call the specific capacity of the well's yield per unit of drawdown. And this can be demonstrated, as you wanted, with any groundwater software as well.

So this is a very serious flaw, and I think it's probably good reason that the Department of Health has this as a draft guidance document. It should not be relied upon in our assessment of water resources as a finalized statement, and certainly would not get a seal of approval from the National Groundwater Association. At this point it needs to be completely revamped.

That's probably the most significant flaw, but let me talk about the other flaws with this Department of Health standard that we're relying on as the proof that there's

adequate water supply for this entire project.

Altering the discharge during a well test complicates the assessment of long-term aquifer performance -- although it is still possible to do so.

Assessment of boundary effects, we heard about before, leakage, et cetera, are greatly complicated; the effects may be masked entirely by changing the discharge; our coefficients of transmissivity and storativity can be calculated from the straight-line portion of this time drawdown curve for the higher pumping rate, if any, but you have to wait a long time, perhaps days or maybe far longer, maybe months for the reduced flow to stabilize enough to give a straight line.

Thus, as seen in Exhibit 82A, the aquifer has not had sufficient opportunity during the reduced discharge rate portions of the well test to reasonably assess the aquifer coefficients of T and S, transmissivity and storativity.

Transmissivity is one of the two most-important aquifer parameters in any sound hydrogeologic characterization that a

potential water supply must assess.

The Applicant lacks the comprehensive hydrogeologic data to fully characterize T and S -- although we can do it peripherally based on the limited data, it's really not complete. Thus, potential approval of the Rosenthal wells as a major water source should not have been approved in the absence of comprehensive and properly conducted and analyzed aquifer testing in keeping with National Groundwater Association approved hydrogeological methods, such as those in Driscoll's Groundwater and Wells, and other authors -- Fedder, et cetera.

At this time, the project approval, based on the analysis presented by the Applicant, has the very real potential of resulting in a large-scale project without adequate water resources.

I'll repeat that. At this time project approval, based on the analysis presented by the Applicant, has the very real potential of resulting in a large-scale project without adequate resources.

I think we saw in the presentation before mine that this aquifer has almost no

storativity; its cone of influence can extend outwards of up to a mile. There are certain preferential fracture sets that can only provide so much water, and then the aquifer just can't handle it.

We've seen that there are multiple

impacts going on simultaneously with overlapping cones of depression of different wells from Belleayre, from the Pine Hill water supply, from homeowners up on the hill involved in another project. They're concerned about the same issue in the same basin. That's a whole 'nother influence of people who are going to be on this aquifer.

The approval of this project based on this draft Department of Health guidance that is not really soundly founded in accepted hydrogeologic methodology would be a mistake.

I'll discuss this just a little further: Non-pumping observation wells are essential for a truly valid assessment of storativity. Pumping results can be extrapolated using a time drawdown plots beyond the immediate areas of the pumping wells, but not beyond the cone of depression.

This extrapolation is difficult and often flawed if no observation wells -- or few aerial observation wells or observation wells with limited drawdown data are used.

The assessment of low permeability or high permeability boundaries, for example, relies strongly on multiple observation wells. Multiple pumping wells can also be used to some extent, but the data is not as reliable.

Importantly, the entire Rosenthal test of the combined 3-well pumping only provides detailed hydrogeological data specific to the area immediately surrounding each of the three pumped wells, and none of what is going on very far afield in the surrounding bedrock aquifer since no long-term continuous data observation bells were used for the test.

Granted, they did use some, but the data is very limited and it wasn't used -- it wasn't plotted. We didn't see the Applicant provide information on transmissivity and storativity based on their calculations. None of that was presented for this approval process.

The project evaluation based on the

proposed Rosenthal well water source must be based on a rigorous evaluation, hydrogeologic assessment of the aquifer, such that standard calculations of transmissivity and storativity can be made.

It's interesting to note that the Applicant did analyze for T and S in their evaluation of the Wildacres Resort and Highmount Golf Club, Highmount Estates water supply -- yet not for this.

Hydrogeologic testing and limited non-conventional "draft" New York State Department of Health guidance at this time does not provide sufficient documentation of an adequate ground water supply.

Hydrogeologic testing of the Rosenthal wells should be completely redone in accordance with the National Groundwater Association accepted procedures.

I'd like to say in support of my colleagues, Dr. Michalski's bedrock fracture model -- if we can turn our attention for a minute to Exhibit 84 and Exhibit 61.

Exhibit 61, first, is a GIS, Geographic Information System, map, depicting

the locations of the Rosenthal wells and the two observation wells that were used in a limited extent during that Rosenthal test, both Residential Well 1 and Residential Well 4, those being the two that were impacted.

What we see -- if we take a look -- excuse me, turn to Exhibit 62. 62, wrong figure there.

MR. GERSTMAN: We're not referring to 61 at this point?

MR. RUBIN: No.

MR. GERSTMAN: Pine Hill water supply?

MR. RUBIN: Pine Hill water supply, the locations are portrayed on a GIS map I constructed shown here as Exhibit 62. On this map, we portray the Station Road Well which was pumped for a period of time, and other wells in the area were monitored to see if drawdown occurred -- as observation wells.

Two of those wells, Pine Hill 1 and Pine Hill 2, did show substantial drawdown during this pumping of Station Road Well. The distance between Station Road Well and Pine Hill 1 and 2 is on the order of about

1800 feet. So on this figure, depicted as a dashed red line, I just point out that there's a hydraulic link because when they pumped the Station Road Well, the Pine Hill water levels decreased.

Now, the fact that we have such a significant distance between the pumping -- one well is pumped and the others that are far away -- is quite significant and certainly goes to help support Dr. Michalski's bedrock fracture model; that we have this cross-connected fracture in the bedrock system, we have anisotropic aquifer condition, and that we must recognize in this situation that not only are we drawing water from far afield in different fractures -- as pointed out by my colleague -- we're drawing water from Birch Creek itself, and all of this is impacting the aquifer. It's drawing it down. And the term that was used by my colleague of mining of groundwater certainly applies to the situation.

There's a very high potential that if this project were approved at this time based on these draft Department of Health guidance

standards, that we would, in fact, be mining the groundwater supply.

At the same time, we'd be impacting the ski resort's water potential; we'd be impacting some clients of mine who are just up the hill from this site, whose wells are fractured bedrock.

Their wells -- I just want to mention this as an aside -- I have four homeowners I'm representing up there. At least one of the wells is over 600 feet deep. Why are they concerned? Three out of four of these wells seasonally go virtually dry, they dewater. They can barely water their lawns from them. They're on the same fractured anisotropic bedrock aquifer system.

Their concern -- and they're in the same area here -- their concern is if 17 new houses go up around them, which is the current proposal -- that first, they can barely get enough water themselves now. If 17 house ring them with new groundwater supplies, that they'll be adversely impacted.

So the concern is very serious, especially when we see how far afield we have

drawdown occurring. So mining of groundwater is very likely what will be going on here if we continue with this approval process.

So really, we need to seek -- or maybe work with the Department of Health, upgrade their draft guidance standards in concert with the National Groundwater Association, reliable groundwater testing procedures.

If we're going to attempt to rely on this water source, we need to really redo the whole test. And we certainly need to apply standard methodologies to calculate transmissivity and storativity.

So we are not in a position now to comfortably use this water supply and -- with the knowledge that there will be no adverse impact to nearby homeowners, to the Pine Hill water supply, to the Belleayre Resort, or that there will be enough water to run the project itself.

MR. GERSTMAN: Any questions, Judge?

ALJ WISSLER: No.

MR. GERSTMAN: May I have a few moments?

ALJ WISSLER: Yes.

(1:17 P.M. - BRIEF PAUSE.)

MR. GERSTMAN: Just to clarify, the 17-home subdivision that Mr. Rubin is referring to are not homes that are associated with this project. It's a separate application for a subdivision.

Mr. Rubin's previous offer of proof was submitted as Exhibit -- Exhibits E and F accompanying our petition.

Mr. Rubin, let me suggest that when we were taking issue with the draft DOH standard, we're not here to suggest that in this forum that DOH ought to redraft those standards or those guidelines at this point.

What we're offering to your Honor is that the methodology that was used by Crossroads to evaluate the availability of water supply didn't meet acceptable and standard methodologies that are known throughout the profession and accepted throughout the profession.

There are some real issues with following a draft guidance document, but our real concern is that the methodologies used didn't follow standard procedures, as you

heard from Dr. Michalski and Mr. Rubin.

I'd like to take a few moments for Dr. Michalski to describe the physics of the recovery effect. I don't know if you want to do that now or you want to come back from lunch.

ALJ WISSLER: How long is it going to be? I would like to complete your presentation.

MR. GERSTMAN: I don't know how long it's going to be. I just sprung this on him.

How long would it take you to describe the physics of the recovery effect just so we can understand it?

DR. MICHALSKI: Five minutes. I don't have much -- just general.

MR. GERSTMAN: Just the notion of -- there's a lot been said about the pump tests that were done in April 2004, and the lack of reliability based upon this recovery effect. I'd like you to comment to the Judge upon the physics of the recovery effects and how it skews, essentially, the test results.

DR. MICHALSKI: The test conducted, the latest one, the April 2004 test, was -- I

would say, a bit of hydrogeologic gimmickry to satisfy certain requirements. They know how to do it. Data doesn't mean anything. They used recovery effect for this.

When we discussed this theoretical model, when I tried to present the slab assumption behind it, it's only for the pumping well, only for the pumping condition.

You have homogenous aquifers is the only source of water, it's confined, its storage is the only source of water. So this model cannot explain recover because this should be -- so recovery, theoretical model assume that there is an injection well.

When you start pumping, at that time there's an injection well which goes into effect. So you continue pumping, and another injection well is going on. So this is a basic for this. The moment you start pumping, there's another injection effect. So you have in extra water recovery going on.

Based on this theoretical model, your duration of the recovery should not be longer than pumping phase. And the recovery phase allows you -- gives you a second chance to

look at the aquifer boundary, at the aquifer situation derived.

And this look from point of view of recovery, as I mentioned before, is not good because what it tells -- that the recovery -- while it's immediately fast initially, because it takes over five days or a week and water level cannot recover -- even during springtime when you have no -- April, you have plenty of water.

So this situation -- this is why I refer to this as mining, effect of over-pumping. But in this particular context of this regulation, what it means, it means when you lower a pumping well, it looks like you work additional injection well theoretically going on to make up for this. So you get this rebound effect, which Alpha cleverly used to satisfy to set a standard, which is not good.

This standard -- I'm not criticizing -- is good for small development, residential, when your pumping rates or pumping needs a couple gallons a minute or 10 gallons a minute, but it should never be

applied, even in this forum, to something -- to 100 gallons a minute, because that's actually the pumping of sustained pumping; because homeowner pump water on and off, it's intermittent. So you have recovery effect in between.

What Applicant proposes is a constant pumping rate, particularly at the critical time of the year, late summer, early fall, because my whole presentation concentrates around this time.

This test actually cannot be evaluated because of the basic condition of constant repumping was not satisfied. It was, as I mentioned, a type of constant drawdown test, so assumption of the test was to keep drawdown constant after some -- utilizing this rebound effect.

What I'm saying to that, they did it by choking the pumping rate -- cut back, cut back, cut back. So continue on this path for a month, and then you would see how much water you can get, what would be surreal pumping rate from this aquifer.

Of course, it still doesn't mean that

you solve all these cumulative impacts because there's other pumping, there's still lots of drawdown development. But that gives you an idea about how much you could get.

MR. GERSTMAN: Thank you. Two final points.

Dr. Michalski, you heard Mr. Rubin's testimony. Do you agree with his analysis and his conclusions?

DR. MICHALSKI: Yes, I do.

MR. GERSTMAN: Judge, we will, of course, be briefing this issue. We believe we have offered substantive and significant issues for adjudication here, both in terms of the methodology used, but also in terms of the impact on other water users and the cumulative impact of this project and the Belleayre Ski Resort expansion, which we believe is forthcoming sometime, on the water supply in this area, but that will be subject to my brief.

ALJ WISSLER: Anything before we break?

MS. BAKNER: No.

ALJ WISSLER: It's 1:25 now. 2:15.

(1:25 - 2:39 p.m. - LUNCHEON RECESS TAKEN.)

ALJ WISSLER: Ms. Bakner and Mr. Ruzow.

MS. BAKNER: First of all, I would like to go through the list of exhibits that we just introduced in connection with water supply, groundwater and surface water.

Just to refresh everybody's recollection, we put in expert resumes a number of weeks ago for Gary Kerzic, Mary Beth Bianconi, Sam Gowan and Mike Palleschi, as well as Steve Trader; and they are our experts to discuss these issues.

Exhibit 97 is a document that details

the experience of Delaware Engineering in the New York City Watershed and all the projects that they have been involved in. We put this on here to show that they worked in many of the areas around here, including the Town of Windham, the Village of Hunter and the Village of Fleischmanns, and they worked on both water supplies as well as wastewater systems.

(DELAWARE ENGINEERING NYS WATERSHED PROJECT EXPERIENCE RECEIVED AND MARKED AS

APPLICANT'S EXHIBIT NO. 97, THIS DATE.)

MS. BAKNER: We also have a letter dated July 28, 2004 from Steve Trader of Alpha Geoscience addressed to Alex Ciesluk of New York State DEC, and the purpose of this letter is to provide a comprehensive response to the comments made by Mr. Habib on the last day of Issues Conference on this topic.

What this letter does -- I'll have Steve address this later -- is basically go through all of the questions that Mr. Habib had regarding Table 1A in a fashion that should be a little bit easier to understand than merely the verbal presentation.

(LETTER DATED 7/28/04 FROM STEVE TRADER TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 98, THIS DATE.)

MS. BAKNER: Next we have geological cross sections prepared by Alpha Geoscience. Exhibit 99A, first one, is a Cross Section

Location Map.

(CROSS SECTION LOCATION MAP RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 99A, THIS DATE.)

MS. BAKNER: Next one is cross section

A-A', 99B.

(CROSS SECTION A-A' RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 99B, THIS DATE.)

MS. BAKNER: And 99C is cross section B-B', and Alpha Geoscience will discuss these later on.

(CROSS SECTION B-B' RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 99C, THIS DATE.)

MS. BAKNER: Exhibit 100 is a compilation of documents. What these are, your Honor, is a copy of the communications between Alpha Geoscience and Global Water Sensor Samplings and Systems, specifically the president of the company, John Dickerman, regarding the calibration of the flow meter. And Steve and Dr. Gowan have brought the flow meter here today just in case you had any follow-up questions regarding that particular issue.

(FLOW METER EXHIBITS RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 100, THIS DATE.)

MS. BAKNER: The next exhibit is

Exhibit 101, which is "Pumping Test Dates and Conditions of the Big Indian Well Field."

("PUMPING TEST DATES AND CONDITIONS OF BIG INDIAN PLATEAU WELL FIELD" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 101, THIS DATE.)

MS. BAKNER: 102 is the Big Indian Plateau Capacities of Water Supply Sources.

("BIG INDIAN PLATEAU CAPACITIES OF WATER SUPPLY SOURCES" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 102, THIS DATE.)

MS. BAKNER: 103 is a comment letter from Steve Trader at Alpha Geoscience to Alex Ciesluk at DEC asking for points of clarification with respect to the draft water supply permit issued by DEC, which has since apparently been superseded.

(COMMENT LETTER DATED 6/21/04 FROM STEVEN TRADER TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 103, THIS DATE.)

MS. BAKNER: Exhibit 104 is a very large map depicting the Existing and Proposed Public Water Supplies in the Vicinity of the Belleayre Resort at Catskill Park.

(MAP DEPICTING "EXISTING AND PROPOSED PUBLIC WATER SUPPLIES IN THE VICINITY OF THE BELLEAYRE RESORT AT CATSKILL PARK" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 104, THIS DATE.)

MS. BAKNER: Exhibit 105 is the Public Service Commission order denying the Pine Hill Water Coalition's petition for rehearing.

(PSC ORDER DENYING PINE HILL WATER COALITION PETITION FOR REHEARING ISSUED AND EFFECTIVE 3/14/02 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 105, THIS DATE.)

MS. BAKNER: Exhibit 106 is the Public Service Commission order denying the petition and the Pine Hill Water Coalition Complaint issued and effective November 1st, 2001.

I would just point out for the record that attached to that decision should be a report on the water supply prepared by Jack Aganski [sic].

(PSC ORDER DENYING PETITION AND PINE HILL WATER COALITION COMPLAINT ISSUED AND EFFECTIVE 11/1/01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 106, THIS DATE.)

MS. BAKNER: The next exhibit is

Exhibit 107, which was Whiteman, Osterman & Hanna's response to the Pine Hill Water Coalition's Application to the Public Service Commission dated July 5th, 2001.

(WHITEMAN, OSTERMAN & HANNA RESPONSE TO PINE HILL WATER COALITION APPLICATION TO PSC DATED 7/5/01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 107, THIS DATE.)

MS. BAKNER: And Exhibit 108 is the Pine Hill Water Coalition Petition to the Public Service Commission dated June 11th, 2001.

(PINE HILL WATER COALITION PETITION TO PSC DATED 6/11/01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 108, THIS DATE.)

MS. BAKNER: Exhibit 109 is the petition to the Public Service Commission for the transfer of assets from the Pine Hill Water Company to the Town of Shandaken, and that's dated 11/15/02.

(PETITION TO PSC FOR TRANSFER OF ASSETS DATED 11/15/02 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 109, THIS DATE.)

MS. BAKNER: Exhibit 110 is the Public Service Commission order approving the asset

transfer.

(PSC ORDER CASE 02-W-1442 APPROVING ASSET TRANSFER FOR PINE HILL WATER COMPANY TO TOWN OF SHANDAKEN DATED 3/20/03 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 110, THIS DATE.)

MS. BAKNER: Exhibit 111 is the Albany County Supreme Court's Amended Decision dated July 16, 2003 regarding the appeal by the Pine Hill Water District Coalition, and others, of DEC's issuance of a modified water supply permit to the Pine Hills Water Company. And that has already been entered -- the permit has been entered already as Applicant's Exhibit 56.

(ALBANY COUNTY SUPREME COURT AMENDED

DECISION DATED 7/16/03 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 111, THIS DATE.)

MS. BAKNER: Next is the original decision by the Albany County Supreme Court as Exhibit 112, and that's dated April 25th, 2003.

(ORIGINAL ALBANY COUNTY SUPREME COURT DECISION DATED 4/25/03 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 112, THIS DATE.)

MS. BAKNER: Exhibit 113 is simultaneously the application to transfer the Pine Hill Water Company's water supply permit to the Town of Shandaken, and the actual transfer itself.

(PINE HILL WATER COMPANY APPLICATION TO TRANSFER WSA DATED 4/7/03 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 113, THIS DATE.)

MS. BAKNER: Exhibit 114 is the letter dated August 8th from Mary Beth Bianconi to Alex Ciesluk.

(LETTER DATED 8/8/02 FROM MARY BETH BIANCONI TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 114, THIS DATE.)

MS. BAKNER: Exhibit 115 is a letter dated August 5th, 2002 from Whiteman, Osterman & Hanna to Alex Ciesluk regarding the Pine Hill system.

(LETTER DATED 8/5/02 FROM WHITEMAN, OSTERMAN & HANNA TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 115, THIS

DATE.)
MS. BAKNER: There's a letter dated June 28th, '02, which is Exhibit 116, another

letter from Whiteman, Osterman & Hanna to Alex Ciesluk.
(LETTER DATED 6/28/02 FROM WHITEMAN, OSTERMAN & HANNA TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 116, THIS DATE.)
MS. BAKNER: Exhibit 117 is a letter dated August 7th, 2001 from Whiteman, Osterman & Hanna to Alex Ciesluk, again, regarding the Pine Hill water supply permit.
(LETTER DATED 8/7/01 FROM WHITEMAN, OSTERMAN & HANNA TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 117, THIS DATE.)
MS. BAKNER: Exhibit 118 is the DEC Notice of Completion of the request for a modified water supply permit by the Pine Hill Water Company.
(NYSDEC NOTICE OF COMPLETION OF WSA BY THE PINE HILL WATER COMPANY DATED 5/24/02 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 118, THIS DATE.)
MS. BAKNER: Exhibit 119 is a letter dated June 13, 2002 from Mary Beth Larkin, Delaware Engineering, to Alex Ciesluk.

(LETTER DATED 6/13/02 FROM MARY BETH

LARKIN TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 119, THIS DATE.)

MS. BAKNER: Exhibit 120 is the Pine Hill Water Company application for a modification of a public water supply permit. The application is dated 4/3/01.

(PINE HILL WATER COMPANY APPLICATION FOR MODIFICATION OF A PUBLIC WATER SUPPLY PERMIT DATED 4/3/01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 120, THIS DATE.)

MS. BAKNER: Exhibit 121 are the public comment letters previously provided to the DEC regarding the Pine Hill water supply application modification.

MR. RUZOW: There are actually two letters that should be attached as part of that one exhibit.

(PUBLIC COMMENT LETTERS PROVIDED TO NYSDEC REGARDING PINE HILL WSA MODIFICATION RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 121, THIS DATE.)

MS. BAKNER: Next exhibit is 122, which is a letter dated July 28, 2004 from Steve Trader, Alpha Geoscience, to Alex

Ciesluk, and this is the response to comments on the water budget prepared by Alpha Geoscience.

(LETTER DATED 7/28/04 FROM STEVEN TRADER TO ALEX CIESLUK RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 122, THIS DATE.)

MS. BAKNER: Exhibit 123 is a table

entitled, "Wildacres Resort - Source Versus Demand Calculation."

("WILDACRES RESORT - SOURCE VERSUS DEMAND CALCULATION" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 123, THIS DATE.)

MS. BAKNER: This is 124.

(FIGURE(11 BY 17) MAP ENTITLED, "PUMPING TEST MONITORING LOCATIONS" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 124, THIS DATE.)

MS. BAKNER: Lastly, we have Exhibit 125, which are photographs taken from the worldwide web of the Pepacton Reservoir during the drought in December of 2001.

(PHOTOGRAPHS TAKEN OF PEPACTON RESERVOIR ON 12/20/01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 125, THIS DATE.)

MS. BAKNER: The experts for CPC have

maintained that our studies were insufficient, that they didn't follow appropriate protocol, and that somehow we did not provide sufficient information in the DEIS.

So what I'd like to start out doing is recounting where in the Draft Environmental Statement we cover the very important groundwater, surface water and water supply sources. Section 2.2.1, C4. Section 2.2.1, D4. Section 2.23, which addresses potable water supply. Section 2.25, which addresses irrigation water supply. Section 2.46, which is energy and materials management, with special attention to water use and conservation. Section 37.1, geologic and topographical resources. Section 3.2, surface water resources. Section 3.3, groundwater resources. Section 5.4, alternative water supplies, which runs to several pages, evaluating existing systems in the vicinity of our proposed water supply.

Volume 2, Appendix 2 contains the DEC permit application, and I just want to note for the record that those applications and the water supply report found in Volume 3,

Appendix 7 have all been superseded by the Conceptual Design Reports for Wildacres and Big Indian which are Exhibits 51A through D, including the revised applications themselves.

Volume 6, Appendix 16 of the DEIS contains a discussion of the use of treated wastewater for golf course irrigation. Volume 7, Appendix 19 goes through a comprehensive surface water and groundwater assessment of the Big Indian Plateau and Wildacres, as well as Appendix 19A goes through the water budget analysis.

The importance of the Conceptual Design Reports is that there were rather -- there were changes between the Draft Environmental Impact Statement and the Conceptual Design Report that reflected different manner in which we propose to do irrigation, and reflected our desire to use R1, R2 and R3 interchangeably for potable and irrigation water. So the best description of our proposed water system is in there.

The way we would like to start out is addressing the geological and hydrogeological issues, and Dr. Gowan and Mr. Trader, if you

could run through your qualifications again for the record, that would be extremely helpful.

DR. GOWAN: I'm Sam Gowan, I have a Ph.D. in geology from Texas A & M University. I also have a Master of Science Degree from Texas A & M University, and a Bachelor of Arts Degree all with majors in geology.

I have been with Alpha Geoscience since 1992. Before that, I was with Dunn Geoscience, which I started there in 1986. As of now, I have over 22 years of experience in geology and hydrogeological consulting.

My primary experience has been in the evaluation of groundwater resources, both water supply, and also evaluating impacts of groundwater and surface water resources. This includes doing water budget analysis, doing evaluations of streamflow, doing pumping test analysis, and other related investigations.

MR. TRADER: I'm Steve Trader, I have a Bachelor's, BS, in geology from Virginia Tech. and graduate school hours at Old

Dominion University. I've been with Alpha Geoscience since 1994, and involved with all

sorts of geological and hydrogeological projects involving pumping tests, fracture trace analysis, water budgets. I've been involved with a lot of contamination issues, petroleum contamination and environmental impacts.

Many of the same projects that Sam has worked on, I've also been there as well, doubled up on a lot of things.

MS. BAKNER: Dr. Gowan, can you explain what professional organizations you or your company belong to?

DR. GOWAN: We are a member of the National Groundwater Association. We're also working in the Geological Society -- I'm personally in the Geological Society of America; Association of Engineering Geology; the American Institute of Professional Geologists; the Hudson-Mohawk Professional Geology Association, which I was a founder and a past president.

The New York State Council of Professional Geology, of which I am the president now, and have been the secretary in the past. That's an organization for

promoting professional license for geologists in New York State. I'm also a member of the Solution Mining Research Institute. I think that covers most of it.

MS. BAKNER: At this point, what we would like to do for your Honor is describe the studies that we've done on the site before we rush into responding to the allegations from this morning. We think it's important to give you an overview of what we have done on the site and the studies.

Steve, if you could go ahead and do that.

MR. TRADER: What I'd like to do is talk about some of the responsibilities that Alpha Geoscience was asked to address, and then I'll briefly give some details on some of the pumping tests that we performed, other water studies we've done for the project, and I would like to start by -- like I said, going about what we were asked to do.

Primary thing we were asked was to evaluate the potential for water supply sources to meet the project demands of Big Indian and Wildacres Resort. We were asked to

assess the potential impacts that the use of these water supplies might have on the existing community water supplies, as well as the local surface water sources such as streams and wetlands, also various springs that might exist in the area. We were also asked to address or assess the impacts of these wells on existing private residential wells.

Also, in general, what would be the project development impact to the groundwater and surface water resources of the area. Those are our main responsibilities.

I'd like to give you -- point out a few site features.

ALJ WISSLER: You're referring to what? Where is this?

MS. BAKNER: This is Applicant's Exhibit 104.

MR. TRADER: Many of these features we're all pretty familiar with by now. We have the Big Indian Resort area which is on the southeast side of a drainage and groundwater divide that separates it from the Wildacres Resort project area to the

northwest. (Indicating)

This divide here occurs approximately where Highmount is, which is where we would meet for several of the outings that we did in the field. (Indicating)

The Belleayre Ski Area is located between the projects, right here, between both Wildacres and Big Indian. Some of the existing water supplies, public water supplies in the area.

We have the Village of Fleischmanns, which has a series of wells and springs. The springs are located just north of the project boundary of Wildacres, just below the railroad tracks, and above Route 28. Fleischmanns has three wells, Wells 1, 2 and 3. Well 1 and 2 are located down in the Emory Brook Valley. Those are each bedrock wells. Well 3 is located between Route 28 and the Village Springs. It's also a bedrock well. (Indicating)

The Belleayre Ski Center recently installed three water supply wells for their potable demand. They're labeled here as 1, 2 and 3. They're located on the east side of

the Highmount groundwater divide at the western end of Crystal Spring Brook Valley. (Indicating)

The Pine Hill Water District, which services the hamlet of Pine Hill, has as its sources a series of springs and wells. Bonnie View Springs, which we visited in the field in the end of May, are located up towards Crystal Spring Brook Valley, right below the railroad tracks. There's three different spring houses there that feed into a reservoir. There's a nearby well, PH-1, also located along Crystal Spring Brook. (Indicating)

MR. RUZOW: Is that a bedrock well?

MR. TRADER: This is also a bedrock well. Another bedrock well is located further down Crystal Spring Brook Valley to the southeast, it's Station Road Well; and Silo B Spring and Station Road Spring are also located right in that same area near the junction of Station Road and Bonnie View Road. (Indicating)

The Pine Hill Water District starts up near Bonnie View Springs and extends down the Crystal Spring Brook Valley, until where it

joins with Birch Creek Valley, slightly to north, northwest, as well as continuing down valley past the New York State DEC day use area. It goes beyond the Rosenthal well field, and ends at the DEP's wastewater treatment plant for the village. (Indicating)

The proposed sources for Big Indian Plateau are located just down valley, downstream from the day use facility of the DEC. There are three wells there, Wells R1, R2 and R3, and they are all three bedrock wells.

Another water source for the project is Silo A Spring, which is located over a mile to the northwest, up Birch Creek and up into Crystal Spring Brook Valley. (Indicating)

DR. GOWAN: I want to mention, your Honor, before we jump -- there's some colored areas that are marked on here. These are recharge areas for water supply features down slope. The green is recharge area for the Fleischmanns' system, the blue is in the recharge area for Pine Hill -- Bonnie View Springs and the Pine Hill system, and the purple is the recharge area for the Silo A and

Station Road facilities. (Indicating)

ALJ WISSLER: Just as an aside, the broken line there that runs around Pine Hill, is that the borders of the Pine Hill Water District? Do you see where I'm talking about?

MR. TRADER: Kind of a rectangular?

ALJ WISSLER: Yes.

MR. TRADER: Yes. I believe that approximates it.

MS. BAKNER: For everybody's reference, the cross sections are Applicant's Exhibit 99A, B and C.

MR. TRADER: I'll first show a map that shows the locations of where the cross sections have been generated. (Indicating)

MR. RUZOW: That's 99A.

MR. TRADER: On the right here, I have constructed a cross section. I've labeled it A-A prime. (Indicating)

ALJ WISSLER: 99B.

MR. TRADER: On a map view, it extends from the Village of Fleischmanns well field and up and over the Highmount area and down into Crystal Spring Brook Valley to the east -- past Station Road Well, continuing

down Crystal Spring Brook Valley until it meets Birch Creek Valley; and on past the day use facility, through well field, and then further to the southeast, to pick up a few of the residential wells that we monitored during our pumping tests. (Indicating)

Just to avoid any confusion, the north arrow on this map -- the whole map has been tilted a little to the left.

ALJ WISSLER: North is pointing northwest.

MR. TRADER: Right, northwest. On the cross section of A-A prime, this has a vertical exaggeration of seven times. The reason for the vertical exaggeration was to show some thickness of the units that were very narrow that wouldn't show up otherwise. (Indicating)

What we see at the top of the hill on the ridge is the Highmount area. Leading down to the west, taking you down a slope towards the Fleischmanns well field. To the east, Crystal Spring Brook Valley and Birch Creek Valley. (Indicating)

Some of the wells that are located on

here. The information from these wells was used in the construction of this cross section, the depth to bedrock and the geology that was encountered at the known locations. The Fleischmanns wells, 1, 2 and 3.

Here is Emory Brook Valley, and you can see the depths of these wells. Well 1 is 70 feet deep, Well 2 is 200 feet deep, and Well 3 is 410 feet deep. They're all three bedrock wells, as I mentioned before.

MR. GERSTMAN: You're going to have to keep your voice up.

MR. TRADER: They're all three bedrock wells, as I mentioned before. There were a couple private wells that were used to monitor that are no longer used to supply water to residences. They're on the project grounds for Wildacres known as the Rashad Well and the Coachhouse Well. They are 475 feet deep and 550 feet deep respectively. (Indicating)

Continuing down the eastern side of the cross section, we come into the Crystal Spring Brook Valley. You see two of the Ski Center wells are located here, Wells 2 and 3, Pine Hill Water District PH-1 Well is located

here. There's a bump here that's reflective where the railroad tracks are. (Indicating)

ALJ WISSLER: How many wells does the Ski Center have, if you know?

MR. TRADER: I'm not aware of how many they're going to be using on a routine basis. It's my understanding that they're going to be using three. I know they have a few more up on the slope, but I think the reason for drilling these is because they weren't that good. (Indicating)

Station Road Well is located here. It's 248 feet deep. (Indicating)

As we move into the Birch Creek Valley, we pick up the day use facility pond.

It's not actually shown on here, but this is the area it covers. The green is not water. We'll get to that in a minute. (Indicating)

Well R1 and R2 of the well field, Rosenthal well field, are located here. 124 feet deep and 274 feet deep. (Indicating)

Residential Well 4, further down the valley. It's a bedrock well; it's 155 feet deep. (Indicating)

Birch Creek is winding in and out of

the cross sections so you see that located here several times. (Indicating)

Finally, Residential Wells 2 and 3. Residential Well 2 is actually a dug well at Mr. Frisenda's house. It's eight feet deep. And Residential Well 3 is a bedrock well, and it is a flowing Artesian well. (Indicating)

I'll address some of the geology on the cross section here. Most of the gray area here is the sandstone and shale and silt stone, bedrock that makes up most of this area in the Catskills. What I'm trying to portray here is reflective of what the population occasion by Heisig that was referenced earlier by Dr. Michalski -- is that we have more intense fracturing of the bedrock in the valleys. The depth of fracturing is also deeper in the valley than it is on the hillsides and hilltops. (Indicating)

Overlying bedrock is a mantle of glacial till. This is a hodgepodge of clay and silt, sand and gravel cobbles. This glacial till is thinner on the hillsides and on the hilltops than it is in the valleys in general. (Indicating)

As you come down Crystal Spring Brook Valley, there's a considerable thickness of glacial till located above bedrock. And by considerable, I mean approximately 100 feet. (Indicating)

As we move down into the Birch Creek Valley, we start picking up some alluvial sediments that are associated with the stream in Birch Creek. We have seen that long Birch Creek stream itself. We see all the cobbles and boulders and sand and gravel that's deposited on that. (Indicating)

That is overlying either a glacial till or a glacio-lacustrine clay, a clay that was deposited by glacial lakes. The clay is reflected here in the dark green interval.

Residential Well 3 has, I think, 80-plus feet of glacial clay involved at that location. (Indicating)

The day use facility was reportedly dug -- the pond was reportedly dug into clay in order to create that. (Indicating)

We actually saw some of this glacial clay at the Winding Mountain Road bridge when we visited that -- I guess that was the end of

May. We could see the layering of the clay, and top of that was the thin unit of sand and gravel and cobble, the recent alluvium deposited by the stream. (Indicating)

Both the glacial till and the glacio-lacustrine clay is a very low permeability. So it's difficult for water to move in these materials.

I think that's a brief overview of what I'm trying to show in this cross section as far as the geology and the different wells.

There's another cross section I put together which goes through the Rosenthal well field. On the map here.

ALJ WISSLER: You're on 99C?

MR. TRADER: 99A and C. The cross section B-prime is located here. It goes from the north to the south, across the Rosenthal well field. It also is including Residential Well 1. (Indicating)

Again, we see the gray here is the bedrock with the depth of fracturing. This is a deeper fracturing in the valley than it is on the hillside and hilltops. (Indicating)

Residential Well 1 is an open-ended

steel casing that was drilled and installed through the overburden and through the glacial till, and into a small sand and gravel unit that is right on top of bedrock. It's just a steel casing with an open hole at the bottom, and it gets its water there. And it's in direct connection with the fractured bedrock beneath. (Indicating)

Well R2 at the Rosenthal well field extends through the overburden and into bedrock. It is sealed, grouted into bedrock to prevent any migration of water down around the well casing. It's an open hole, from that point down, 274 feet. (Indicating)

The thin layer of green here that you see, light green is the alluvial deposition that is along the Birch Creek Valley. At this location, the drilling log provided by the well drillers did not indicate a clay at that location. (Indicating)

For reference, I've shown where the future fairways are proposed for holes 14 and 15. (Indicating)

DR. GOWAN: I think, your Honor, we should emphasize that the bedrock aquifer

boundary is really the upper few hundred feet of the bedrock. I know we heard some testimony this morning about the Heisig and Reynolds reports.

MR. GERSTMAN: Excuse me, could you keep your voice up, please.

DR. GOWAN: Yes. We heard testimony this morning about the Heisig and Reynolds reports, and in those reports, they talk about the depth of fracturing in the rock. When you get up on the hillsides is less than it is

when you get into the valley. It's greater in
the valley.
They also talk about the stacked
aquifer system which, in fact -- what that
does is as that water -- it mirrors the
topography because it's basically this
fractured, weathered rind -- it follows the
topography. And as you get down deep, there
are fractures in depth but they're very tight,
they move very little water. It's really the
fractures towards the top that move the water.
So in effect, your aquifer and your
flow is going to follow the topography.
That's going to be important when we talk

about things like divide -- I know Mr. Trader
mentioned the divide at Highmount -- because
of the higher relief there, and that brings
the level of the fracturing, that brings the
aquifer system up so that your water flows in
both directions off that divide. So your
surface water and groundwater divides
basically mirror each other. (Indicating)
This is commonly what we see in the
Catskills, and really throughout New York
State, where we have shales, siltstone,
sandstones. Other types of rocks may have
different kinds of situations, but in this
type of environment where you don't have major
faults or features like that where your
fracturing is pretty much bedding plane, as we
heard this morning, and also vertical

fractures -- when you read those reports, you see that it's both vertical fracturing and horizontal fracturing that's important.

What I want to say about the stacked aquifer system where you have packages of sandstone separated by shale layers, what happens is that water will enter those fractures, move down slope, and when it

encounters that shaley zone, that forces it out. And that's where you get these contact springs.

I know when we walked these streams, start -- for example, the Mid Road Spring, spring is well up on the slope, then the water disappears underground, and as you go down the slope, periodically you'll see the water reappear as springs. And that's what's happening. So it's coming down that thin bedrock aquifer and popping out where you have those shales that are bringing it out.

So the point I want to illustrate is you're not seeing the stacked aquifer system all the way through the core of the mountain; your primary aquifer is really a shallow surface, if you will, the upper 200, 300 feet.

MR. TRADER: So a portion of that water is going to go into the bedrock and occasionally pop out and back in again. Some of it does not pop back in again, and it continues on down and flows down to Birch

Creek.
The remaining water continues on down in the bedrock fractured system into the main

access of the Birch Creek Valley. This figure here, think of it as the end of an arrow from a bow and arrow that is showing flow going away from you, into the picture down the valley. (Indicating)
So that's our brief overview there. I'd like to just direct you to some of the valuations we did for the water supplies for the Big Indian Plateau at this point.
Silo A Spring which -- back to Exhibit 104. Silo A Spring was monitored for approximately two years, monitored for two years on approximately a monthly basis. This was between the year 2000 to 2001. From January 2000 to December of 2001. The flow during that time period in Silo A was measured to be 69 gallons a minute, up to 212 gallons a minute. That was the range.
In the later part of 2001, there was a very dry season starting in about August, eventually which became a drought by the time November and December came along. The DEC issued a drought watch for November, and in December it turned into a drought warning.
During that whole time, Silo A flow

did not fall below 69 gallons per minute. Actually by December, it started to climb back up again. It was up to, I think, 78 gallons per minute.

ALJ WISSLER: Where is that collected, that data?

MR. TRADER: That data is located in the infamous Table 1A; part of the surface water and groundwater assessment. The DEC has issued the temporary -- the DEC has issued a draft permit for the water supplies, and for Silo A, it has a limitation or a restriction on its use. That restriction is due to that low flow measurement that we did.

During times of drought, Crystal Spring Brook can provide a significant portion of the Crystal Spring Brook flow. That's the stream that Silo A is discharging to naturally. So, based on what's known as the tenant method, for a stream to maintain viable aquatic life, the flow should be above 30 percent of the average flow of the stream.

So for Crystal Spring Brook, Table 1A measurements again, based on those measurements, the average flow times

30 percent is 797 gallons per minute. So when the flow in Crystal Spring Brook is such that you're in a drought-type situation, the use of Silo A is restricted such that you don't cause Crystal Spring Brook to drop below that.

MS. BAKNER: Your Honor, I think at this point we would like to point out that in the draft water supply permit that was introduced by the Department previously, there is a Special Condition 3 that says: "Silo A is not to be used for irrigation purposes. Also, use of this source shall be further eliminated as follows based upon the measured flow of Crystal Spring Brook below the Silo's overflow point." And it specifies maximum withdrawal rates, depending upon the quantity of flow in Crystal Spring Brook.

So it has a maximum ever of 69 gallons per minute, which as Steve just mentioned, was its rate of discharge during a drought; and up to 34 gallons per minute if the flow is 797 to 1,328 gallons per minute, and up to 10 gallons per minute if the flow is less than 797 gallons per minute.

There's some additional language that

says: "Withdrawal rates of 69 and 34 g.p.m. shall not be resumed until flows in the brook return to 1,397 and 831 gallons per minute respectively, for a continuous period of at least one week." Then it just indicates that: "The flows are to be measured in a manner approved by the Department."

So that addresses the issue of the connection of Silo A to the baseflows or the flows in Crystal Spring Brook.

MR. TRADER: I'd like to concentrate now a little more on the evaluation of the Big Indian Plateau well field or the Rosenthal wells, R1, R2 and R3, and I guess we need to bring out --

MS. BAKNER: Exhibit 102. This is Exhibit 124.

MR. TRADER: Exhibit 124 is this map. Exhibit 102 is the Big Indian Plateau Capacities of Water Supply Sources.

Alpha conducted many pumping tests between 2001 and 2004. The tests developed as the project itself was developed. This table, Exhibit 102, shows for each of the wells the tests that have been performed.

These range from step rate tests to 72-hour individual pumping tests, and combinations of different wells. R1 and R2 were tested together, and R1, R2 and R3 were also tested together.

The step rate test, I think we heard some mention of that this morning. That is done just to get yourself a proper rate with which to pump -- a longer-term pumping test, a 72-hour pumping test. You're pumping the well at successively higher rates and looking at the reaction of the water level in the well.

We did a 72-hour individual test on Wells R1 and R2. Those were -- let's see, September 2002 was for Well R1. The very first pumping test we did was actually with Well R2 in the drought of November 2001.

What I'd like to focus on now is the

simultaneous testing of R1, R2 and R3. This was a 75-hour pumping test. The purpose for this pumping test -- and the other pumping test -- was to assess capability of the well field to meet the demands of the project for irrigation and potable sources.

We wanted to also assess the

capability of these wells in meeting the Ten State Standards, and especially with this most recent test, we had to make sure that we met the DOH requirements that they issued in response to the protocol that we had submitted to them.

MS. BAKNER: The protocol that Alpha Geoscience submitted to the Department of Health and to the Department of Environmental Conservation is found in Exhibit 51, and the response -- Jack Dunn's response -- is also included right after that, and in it he directs us to undertake the test in a specific manner which is represented by the draft standard which was referenced earlier today.

MR. TRADER: Right. Also, we wanted to assess the potential impacts of the use of these wells on the local groundwater and surface water resources. The Ten State Standards requires that you have to be able to meet -- with your water sources, you have to be able to meet the maximum day demand for your project.

ALJ WISSLER: Where are the Ten State

Standards? Are they part of the Public Health

Law?

MR. RUZOW: They're referenced in the regulations as a standard to meet for public water supply. There's separate standards for wastewater. But it's referenced in the DOH reg.'s themselves. The 1997 version, I believe, is the most current.

MR. DUNN: John Dunn, State Health Department. It's referenced in Part 5-1 of the State Sanitary Code, and the current edition that's referenced is Recommended Standards for Waterworks 1997. There's another version out, but it hasn't been incorporated into the code yet by reference.

MR. TRADER: So the table of Big Indian Plateau Capacities of Water Supply Sources, the maximum day demand for the project is 132 gallons permit. That amount is met with the use of the three wells. We have 149 gallons per minute, combined capacity. That number is actually not shown on the table as 149, but you just sum up the combined capacity here, column 3, 63, 74.5 and 11.5 is 149 gallons per minute. That was the test rate that we did in the April combined

testing.

The other aspect of the Ten State Standards is that you must be able to meet your average day demand with your largest producer out of service.

In this case, our largest produce is Well R2. Here in the fifth column: Capacity with the largest producing well out of service during a drought. We have 77 gallons per minute for R1, which was based on an individual pumping test on that well, and 11 and a half gallons a minute for Well R3. Together it was rounded up to 89 gallons per minute. So we meet that standard as well.

The DOH protocol and its modifications that were required for us to meet during this pumping test had two main aspects to that. One was it had to occur for at least 72 hours, and our pumping test ran for 75 hours. There was also, as we heard before, the mention of -- we had to meet the definition of stabilized drawdown that the DOH put forth, which was a half foot of fluctuation per 100 foot of water in the well.

MR. RUZOW: No more than a half foot?

MR. TRADER: Right, no more than a half foot of fluctuation. And this was to be during the last six hours during a constant rate portion of the test. This standard was also met by that pumping test, in all three wells.

MS. BAKNER: Steve, I just wanted you to add -- when you did the pumping test, who was present during the -- for the end of the pumping test?

MR. TRADER: Ulster County DOH personnel came out towards the end of the pumping test, for the last two hours of the pumping test. Alan Dumas was out there, and he agreed, in looking at the data that was presented, that it was okay to stop the test. And that was at 75 hours.

I'd like to identify again the surface water features around -- local to the well field as well as the groundwater resources.

Birch Creek runs right through the well field. R1 is located on the north side, R2 and R3 are on the south side.

ALJ WISSLER: We're looking at Applicant's 124?

MR. TRADER: 124. There is a wetland area to the southeast of the well field. It's not really shown here except for a pond gauge that we measured the water level in there. It's a beaver pond in a wetland that's fed by some springs.

Residential wells that were monitored during the pumping test -- four of them, Residential Wells 1, 2, 3 and 4. And I'll tell you a little more about those.

Residential Well 1 is located across Route 28 to the north, at least approximately 675 feet or so away from the well field. It's 50 feet deep. On the cross section, I showed how that was tapping into a sand and gravel deposit that was located directly on the fractured bedrock. (Indicating)

The next well out would be Residential Well 4; it's also a bedrock well. It's located 1,500 feet to the east. (Indicating)

Residential Well 2, which is Al Frisenda's well, is a dug well, it's a shallow well. It's installed into the surficial alluvium, and actually he dug it into the underlying clay to act as a sump. So it's a

total of eight feet deep. That's located about 2,700 feet to the east. (Indicating)

Residential Well 3 is a flowing Artesian bedrock well. It is 145 feet deep, and it's 3,300 feet to the east. (Indicating)

That's all downgradient when you head towards the east. Groundwater flow is in this direction towards the east, down the main access of the valley, as is shown by the back end of that arrow. (Indicating)

Heading upgradient -- we're going to leave this map now, go back to --

ALJ WISSLER: 104.

MR. TRADER: Exhibit 104. The well field is here. We're going to head up Birch Creek and into Crystal Spring Brook Valley.

The public groundwater source here, Station Road Well. We monitored the water level in that throughout the test. We also measured the production, the yield of Silo B

Spring before, during and after the test.
(Indicating)

I'd like to outline the monitoring that we did, not just water levels but the discharge rates and all that that we did for

the pumping test.

We monitored the water levels, of course, in all three of the pumping wells. This was done with transducers which automatically do water level collection, as well as with a water level meter by hand, checked it out, what the depth was.

We monitored water levels also -- also in the pumping wells. We monitored the discharge rate of R1, 2 and 3 throughout the test to make sure it was pumping what we wanted it to be pumping. (Indicating)

Also, we monitored the water table aquifer which exists above the till and above the clay in the alluvial deposits at the surface. We did this through well points; Well Point 2 and Well Point 3. Each well point is located such that it lies between the creek and one of the pumping wells.

So each pumping well has between it and the creek a well point. Those are driven by hand into the ground between 7 and 10 feet deep. The purpose was to monitor any effects on the water levels there that might have been induced by pumping at the well field.

The wetlands -- as I said before, the Beaver Pond located southeast of the well field was measured, the water level was measured at a pond gauge we installed labeled P-1. (Indicating)

We did stream gauging in Birch Creek at two locations, both of these locations are upstream of the discharge waters from the pumping wells. SG-2 is the furthest upstream and -- I'm sorry -- SG-1 is upstream from SG-2. Both of the stream gauges are upstream from the discharge location. (Indicating)

MR. RUZOW: When you say the discharge location, you mean the discharge of the water that you're taking out of the wells during the pumping?

MR. TRADER: Right.

Also on the Pumping Test Monitoring Locations map are the water quality locations where we measured the different water quality parameters of the surface water in Birch Creek and also in Rose Mountain Creek.

We have two locations in Birch Creek monitoring the water quality during the pumping tests. WQ-1 is located upstream from

the discharge point of the pumping test. WQ-2 is located downstream from Rose Mountain Creek down by Al Frisenda's house. (Indicating)

We also have a measuring location where we monitored parameters for water quality at WQ-3 on Rose Mountain Creek.

DEP's wastewater treatment plant is located between the well field and Rose Mountain Creek. It discharges here into Rose Mountain Creek, just above Birch Creek. And we monitored water quality in that outfall as well. (Indicating)

Basically we're monitoring temperature, pH, conductivity and turbidity.

I'd like to finish up talking about the results of this combined 75-hour pumping test.

We were able to sustain 149 gallons per minute. We met the stabilized drawdown requirements that were put out by the DOH. No impacts to the Pine Hill Water District system were observed. We know that because we measured not only the flow out of Silo B during the test -- we measured the discharge there, no change in that was really evidenced.

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We measured that before, during and after the test.

Station Road Well was not affected by the pumping test either. Station Road Well is a bedrock well. It serves as kind of a sentinel well for any other water supply wells up valley, including PH-1. We saw no impacts to the surface water bodies that exist.

We examined the beaver pond at the wetland area. No change there reflective of the pumping rate. I think actually the water level actually rose in that.

The well points. There was no change in the well points that was attributed to pumping at the Rosenthal well field. We monitored the water levels in those three well points before, during and after the pumping tests. The reason we monitored there, again, was to see if there was any influence on the water table -- water levels in those well points which are representative of the water table.

MR. RUZOW: How close were those well points to the wells you were pumping?

MR. TRADER: They were very close.

50 feet or so in general. 50 feet.

There was no drawdown evidenced in an upgradient -- I already talked about that, I'm sorry. I'll get back to the bedrock residential wells.

There was an effect in the water level on some of these wells, specifically Residential R1. That's not a bedrock well, but it is a deep, unconsolidated well. That's this well right here, 50 feet deep. The pumping test drew down -- the well field pumping test drew the water level in the residential well down by a grand total of three and a half feet. That is located 675 feet to the northeast. (Indicating)

Residential 4, located 1,500 feet

away, total drawdown of 24 feet, or approximately 24 feet, was observed there. (Indicating)

The next bedrock well we have downgradient was the Residential Well 3, the flowing Artesian well. It was flowing at approximately three-quarter gallon per minute, and no observable change was observed during the time of the pumping test. It kept

flowing. (Indicating)

The water quality results also confirmed no direct surface water influence to any of the wells. The water quality measurements that were made in Birch Creek were fairly consistent and they were distinct from the water quality results of the monitoring of discharge water from each of the three wells.

I should also say we had to collect laboratory analytical samples of water from all three wells, and they were submitted to the lab for analysis for the DOH's Part 5, which is required for drinking water sources for public supplies.

MS. BAKNER: Steve, can you explain briefly why it's significant that the quality of the water in the creek was different than the quality of the water taken in the water tables in the bedrock?

MR. TRADER: Yes. The fact that the

water quality remained consistent in Birch Creek, and also distinct from the water quality that we saw in the well discharge, that means that there was no connection. It's

an indication of no connection to the bedrock wells from the surface water features, primarily Birch Creek.

Birch Creek is running along this surficial sand and gravel, which lies directly on top of a thick glacial lake clay. Throughout most of the Birch Creek Valley, from the well field down, it might be a thick glacial till directly where the well field is. There was no connection witnessed between Birch Creek and those wells.

DR. GOWAN: Your Honor, that's a pretty normal procedure when you're near a stream and you're testing a well and you're concerned for influences of surface water. That raises the level of treatment and so forth that you have to do to the water if you have an influence from surface water.

So you monitor the water quality to see if you have any trends. You may not end up with a quality exactly the same as the stream, but in time you should see a progression more towards quality like the stream as you continue to pump. But we didn't see that kind of trend.

MR. TRADER: That's it.

MS. BAKNER: What we're going to do next is respond to the issues that were raised this morning, and go through some materials that Steve and Sam have developed in response to the written materials that were submitted. Then we're going to have some representatives from Delaware Engineering talk about the demand, and Kevin is going to address irrigation.

I'm directing these questions to either of you. Dr. Michalski claims that the proposed groundwater withdrawal rates from the Rosenthal wells cannot be sustained over dry weather periods. Do you share that opinion?

DR. GOWAN: No, I don't. What you will see -- since we did the 3-well simultaneous pumping test, we reached a stabilized drawdown. As time proceeds and recharge conditions change -- in other words, if you go into a dryer period, what's going to happen is you're going to go back on to a drawdown period where you're going to lower the level in your pumping wells and you're actually going to extend your influence out a

greater distance.

What we did in the pumping test is that we achieved a stabilization, and what that means is that we extended the cone out to the point where there's sufficient recharge within that zone of draw to sustain the level in that well. And during times of lower recharge in dryer periods, you're going to have to reach out a greater distance to get enough recharge to sustain that well. When you come back into a recharge period, the distance of your influence is going to shrink and your water level in your pumping wells is going to climb.

It's also affected by the fact that it's not going to be continuously pumped. This system is not going to be continuously pumped at 149 g.p.m. I believe the maximum demand --

MR. TRADER: 132 is on the permit.

DR. GOWAN: That's our maximum demand number that you rarely -- you rarely pump to the maximum level. You're more often going to pump to an average level, and I think Delaware is going to address that later and we'll give

you a more realistic number.

So your cone of influence and your level and your pumping well is going to fluctuate with that too.

MS. BAKNER: Dr. Gowan, if you could cover please for us -- what is the area that's contributing to the Rosenthal wells and the Pine Hill system? Is that a small area of a couple miles? Is it a large area? Could you maybe go over that for us on the plan there.

DR. GOWAN: Well, these wells are in the valley and recharge area, which is essentially the entire drainage divide -- entire drainage area, which is essentially everything within the surface water drainage basin which corresponds with the groundwater drainage basin. That's what's contributing the water down towards these wells. So you have a huge area of recharge. (Indicating)

But if you want to look at it in terms of how many gallons per minute that we would -- that is represented by this pumping test, which is 149 gallons per minute, and if you want to look at it in terms of how much land area do you need to support 149 gallons

per minute, you only need 288 acres. This is a very, very small part of this huge drainage basin.

And the way I come up with that number -- and I basically took a conservative number for rainfall which is down in the valley which we know in the valley -- different from Slide Mountain which is up high where we had over 60 inches average annual precipitation -- if we're down in the valley, we might be as low as 40 inches precipitation.

And in a lot of the publications that you read from the USGS, they use a number, somewhere in the neighborhood of one-quarter of that is available for recharge. So if you assume 10 inches of recharge, then over a period of a year, you only need 288 acres to support that 149 gallons per minute.

MR. RUZOW: The simultaneous pump test didn't take into account the artificial recharge that the project is proposing to provide as well; by that I mean irrigation and return of effluent?

DR. GOWAN: That's correct. When we look at a water supply and we look at an
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impact to a basin, the first thing we ask ourselves is: Is this water going out of the basin? If we had a municipality and they were coming into an aquifer system and they were pumping it and taking it across the drainage divide and they're using it in the municipality outside of the drainage divide and putting it through their sewage treatment system and taking it out of the basin, that's a loss of water to that basin. That's not happening here.

What we're doing is we're taking water out of this well field, putting it back up into the recharge basin where some of it, granted, will be lost to evaporation, but a good percentage of that is going to be either discharged to the effluent system where it's going to go back in to maintain the baseflow in the creek, it's going to turn to groundwater and it's going to be an actual surcharge on the groundwater recharge. And that's going to show up in springs, that's going to show up in the maintenance of baseflow in the streams, and also the water levels in the system.

Interestingly, this is going to occur -- maximum would be in the driest part of the year. It would be helping to sustain that baseflow in the dry season.

We see something different at the Belleayre Ski Resort where they're using this for snowmaking. So they're putting a surcharge on the flow in the spring. So you see a slug of that surcharge, and then that's gone. It doesn't help you much in the summertime. But that's not a negative impact either, because there's a delay of getting that groundwater recharged out to the springs so they're benefiting the system too.

MR. RUZOW: But the proposed use of effluent for irrigation purposes supplemented by other irrigation water during the driest period of the year is something that doesn't occur today in terms of demands on -- demands created by the Pine Hill Water System and other uses currently?

DR. GOWAN: That's correct.

MR. RUZOW: So you're adding water to the overall regime over that which is currently available during that summer time of

year?

DR. GOWAN: That's correct.

MS. BAKNER: In light of that evaluation, do you anticipate that the use of the bedrock wells will have any kind of an adverse effect on surface water baseflows such as Birch Creek?

DR. GOWAN: No.

MS. BAKNER: We have heard quite a bit about the use of bedrock wells in this area inducing the upward migration of saline water. Can you give us your thoughts on that; and particularly, if you can relate it to test results that you have obtained from bedrock wells.

DR. GOWAN: Yes. First, I'd like to point out that I have particular experience in this area. In fact, I had communicated with Paul Heisig, the author of one of these reports back in '99, when he first came out with the report because I had two cases I was working on involving contamination of aquifers with salt.

And as it turns out, one of the cases was our client who happened to be a

municipality, and they contaminated the surface water. The other case happened to be an over-pumping scenario, much like we heard this morning. That's why I got to know Mr. Heisig.

Our situation out here is a little different in that we do have wells that are pumping. In fact, Well Number 3 at

Fleischmanns is 410 feet deep, and I understand from Delaware Engineering -- and they can talk to this further on -- that Well Number 3 for a period of time has been pumped continuously. And we know that it's pumped often enough now to sustain the level as needed in their spring water supply in their reservoir.

When we examined that well, it had a very low concentration of chloride, less than 20 parts per million. It's very clean relative to salinity.

I would also like to point out that there was some discussion this morning about Well Number 1 at Fleischmanns having a high conductivity. That was -- it was high, the numbers were correct. That happens to be a

shallower well; that happens to be 70 feet deep, and is close to the stream.

If you recall, I know we've heard this in the testimony before, that well -- actually piping from that well got destroyed by a flood in January of 1996, so that well has been off-line since '96, and we brought that on-line for a very short-term capacity test back in, that would be the fall -- fall of 2000.

I have to verify that number, but we ran a short-term test, and one of the problems that we encountered, of course, is that this well has been sitting idle for a long period of time, and there was a fair amount of iron, bacteria and crustation in the well. We have a higher content of iron -- relatively higher in iron, I should say, relative to the other two wells. But the chloride level, corresponding chloride level, was still just like the other two bedrock wells in Fleischmanns.

So we don't see this salinity issue at Fleischmanns in a case where -- I kind of like to think that's our canary in the coal mine

for our local area. If we were going to see a problem, we should see that now in the Fleischmanns Well Number 3.

MR. RUZOW: Because of the level of pumping that occurs there?

DR. GOWAN: Yes, because it's been pumped for an extended period of time. And if you were over-pumping that well, and if you had a saline condition at depth, then that would indicate that's a potential problem.

MR. RUZOW: From the conductivity that you found, though, you associated with the potential with the iron levels as opposed to saline levels?

DR. GOWAN: Yes.

MS. BAKNER: There was a lot of discussion this morning about the geophysics of boreholes. I guess what I would like you to do now, if you can, address for us why the -- the types of studies that were described by Mr. Michalski were not done here.

DR. GOWAN: Well, first off, the kind of work that we do is very practical application.

MR. GERSTMAN: I'm sorry?

DR. GOWAN: It's far more practical to go by the drilling, and we like to have a geologist on the well site to make the observations about when a fracture is encountered. And you can tell that by the way the drilling is progressing and changes in your available water as you hit those fractures. That's pretty standard practice.

Then we want to look at connectedness of fractures. That's where your pumping tests come in. That tells you how connected these are.

As far as the borehole geophysics are concerned, they're really focusing on what's going on immediately around your borehole. That's telling you -- that's giving you another picture, if you will, of where the fractures are, and whether they're flowing within that hole, within that immediate drill hole environment. It doesn't tell you anything about the connection of these fractures to the larger area. It's expensive, and the result is not warranted.

Quite often you see that kind of data

collection in more of a research kind of

environment where you might be willing to spend a lot more money to try to understand a lot more about the physical characteristics of those fractures, where you intersect them in the borehole.

MR. RUZOW: Might you also use it in a remediation? If you're trying to identify a remediation technique for contamination, does it become more relevant in that context than in a typical water supply?

DR. GOWAN: Yes.

MR. TRADER: Flow meters are sometimes used, borehole flow meter devices, to see whether water is flowing up or down, whether contamination would be flowing down to another fracture, or maybe it's coming up.

MS. BAKNER: In terms of the study that you did for this project, in your professional opinion, would there be any point in doing that type of analysis?

DR. GOWAN: No.

MS. BAKNER: It wouldn't provide any more information that would be helpful or more helpful in addition to the pumping tests?

DR. GOWAN: No.

MS. BAKNER: It was suggested several times this morning that a 72-hour pump test simply won't cut it for a project like this, that for some reason we should do a month-long pumping test. Can you describe whether you have ever done a month-long pumping test in connection with the public water supply?

DR. GOWAN: Never. 72-hour is the standard. And the reason we do 72-hour test is that is long enough to either reach stabilization, or else get a change in your curve that tells you enough how the -- how the aquifer system is behaving. That's -- 72 hours is the standard that you see pretty much across the industry.

MS. BAKNER: Is it only a standard used by New York State Department of Health, or is it used by other similar entities?

DR. GOWAN: It's used by other entities.

MS. BAKNER: So the Delaware River Basin or Susquehanna River Basin, they would use a similar kind of test?

MR. TRADER: Yes, they would, 72-hour test.

MS. BAKNER: We have heard some criticism, and I'm sure the Department of Health will have no trouble defending their test. There's some suggestion that somehow the Applicant took advantage of a draft standard. Can you describe to the contrary sort of what happened?

DR. GOWAN: Well, we really would have preferred -- and we had discussions with the

Department of Health -- to run the test at a higher rate and do what we had done on a previous test actually, R1 and R2 combined test, where we pumped at a higher rate and watched for the behavior of the curve.

ALJ WISSLER: When did you do that?

DR. GOWAN: It's on the table that Mr. Trader showed you.

MR. TRADER: That's September of 2002.

MR. RUZOW: For R1 and R2.

MR. TRADER: The combined test for R1 and R2.

MS. BAKNER: What was also significant about the time period within which you did that test?

DR. GOWAN: That was during the

drought.

MR. TRADER: September 2002 was considered a drought watch.

MR. RUZOW: So we performed the test in the manner in which they were suggesting that it be performed this morning at that point in time for R1 and R2?

DR. GOWAN: That's correct.

MR. TRADER: It was a constant rate test. The duration was 72 hours, so in that sense, yes.

MS. BAKNER: And the results and description of that test are included in the Draft Environmental Impact Statement.

ALJ WISSLER: But not summarized in

Exhibit 102? 102, there is only one set of values and four test days?

MS. BAKNER: That's correct, your Honor. The reason why the Department of Health required us to do the test following their draft standards was to satisfy their questions regarding the sustained capacity of the wells. So of course after that protocol was approved, the test was undertaken and the results were provided to the Department and

from those results, those numbers came.

MR. RUZOW: We were adding a third well, and we were trying to -- we were going to demonstrate or seeking to demonstrate the combined yield available from all three wells.

ALJ WISSLER: But again, the summary that is 102?

MS. BAKNER: That's correct.

ALJ WISSLER: That is Exhibit 102?

MS. BAKNER: That is correct.

ALJ WISSLER: Just looking at Well 1, it says gallons per minute for the individual capacity, that set of values all the way across that, that's for the step drawdown test of August 2002; correct?

MR. TRADER: No. I guess we should have centered those on that table.

ALJ WISSLER: Where does that belong?

MR. TRADER: The summary of pumping tests is not directly related, if you go across, to any of these numbers. That's just a list there. These numbers -- the individual capacity for R1 and R2, 77 gallons a minute and 82 gallons a minute respectively, those individual capacities were determined in the

year 2001 at individual pumping tests that were performed. We pumped R1 by itself, and monitored everything around it. Then we ended up pumping R2, and monitored everything around it. So these are the individual pumping tests.

ALJ WISSLER: From 2001?

MR. TRADER: From 2001.

MS. BAKNER: R2 is 2001, R1 is 2002. Just to clarify that. That's shown on Appendix Exhibit 101.

ALJ WISSLER: I understand. Looking at 102, 102 has this -- there's five columns over. Says, "Summary of Pumping Test Monitoring Analysis." If we look at individual capacity, 77 gallons a minute and 110,880 gallons per day; that is the result of a test that was done in 2001?

MR. TRADER: That was the 72-hour individual test that was done in September of 2002.

ALJ WISSLER: Of 2002?

MR. TRADER: Yes. For R2, the 82 gallons per minute was the 72-hour individual test done in November of 2001.

ALJ WISSLER: So going back to R1, those numbers should be associated with September 2002 for a 72-hour individual test?

MS. BAKNER: Only in the individual capacity column. In the combined capacity volume, the values come from the April 2004 simultaneous well pump test of R1, 2 and 3. So you see for R1, it's 63 g.p.m.; for R2, it's 74.5 g.p.m.; and for R3, it's 11.5 g.p.m., and that's because they affect each other.

ALJ WISSLER: Okay.

MS. BAKNER: Let's get back again to the reason why we do pump tests. You did two types of pump tests out at the site -- actually more like three or four type pump tests out at the site, including this most recent one in April.

As a result of everything that you've seen out at this location, are you confident that there's enough water to supply the resort?

DR. GOWAN: Yes.

MR. RUZOW: And without impacting other sources of supply in a material way?

DR. GOWAN: Yes.

MR. TRADER: Yes.

MR. RUZOW: And that includes the levels of Birch Creek or Crystal Spring Brook as well?

MR. TRADER: Yes.
DR. GOWAN: Yes.
MS. BAKNER: There was discussion again this morning about the stacked aquifer conditions, which I know you have described more fully in relation to what actually occurs on our site. There's the allegation that somehow increased pumping at the Village of -- at the Village of Fleischmanns' water supply location will have an impact on the other side of the groundwater divide and Crystal Spring Brook. Could you address those claims, please.
DR. GOWAN: Yes. The first thing I'd like to say is if this was an issue, it would be affecting the springs that exist over in the Pine Hill side already, and that's not happening.
And the other aspect of this is what I described earlier about the groundwater

divide, and the way the water table mirrors the topography. And as you get down into the core, if you will, of that Highmount point, high point there, topographic high, the permeabilities at that point are very low.
And one of the points that was made by Dr. Michalski is that there's a bedding plane parting that he is projecting through this system, through Highmount to the area on the east side over towards Pine Hill and Birch Creek and so forth. Well, that fracture

system -- and I think we also heard some testimony this morning from Dr. Michalski that structures are not necessarily continuous.

I would agree with that. And I would agree with that, particularly when you get under -- at depth under Highmount where those fractures are just not going to be very permeable. They're going to be fairly tight, if they exist at all. So I don't think there's any merit whatsoever to the concept that you're going to pump over at Fleischmanns and affect what's going on over in Pine Hill.

MR. RUZOW: Or vice versa, pumping at the Rosenthal wells and somehow affect the

wells on the other side of Highmount?

DR. GOWAN: That's correct. Maybe Mr. Trader can talk about the relationship of what he saw on the pumping tests in Pine Hill and the silos and Station Road Well.

MR. TRADER: For one thing, like I said before, there was no effect on Station Road Well, which is further upgradient to the west during the pumping test, no water level change that could be attributed to the pumping was noticed in the 75 hour's duration of the test.

DR. GOWAN: This is important because we know that in a previous pumping test when we were doing work on the Pine Hill Water System, and I believe we were pumping Pine

Hill Number 1 --

MR. TRADER: This one you're talking about would be Station Road Well. We pumped that one at 39 gallons a minute.

DR. GOWAN: And that had what kind of effect?

MR. TRADER: It drew down the water level in PH-1 by -- I think it was about four to five feet approximately. We saw the number

this morning. I don't know it right offhand, but I think it's approximately four to five feet.

So what that tells us, your Honor, is that there's a connection in that zone from Pine Hill, down Station Road, and if we were going to have a connection -- if we were going to drawdown the Station Road Well during our Rosenthal test -- if we didn't draw it down, then we weren't going to be affecting the Pine Hill Well. So we know that we're not drawing all the way up to that extent. I don't know if that was clear.

Station Road Well is over a mile upgradient from the Rosenthal well. So heading upgradient, about a mile up that way. The distance from Station Road Well to PH-1 is a much shorter distance. We saw an effect at PH-1 when we pumped Station Road Well. That's similar to seeing an effect at Residential Well 4 when you're pumping at the well field.

MR. RUZOW: You're saying the

gradient -- the groundwater has a gradient just as the surface waters do, heading towards the east?

MR. TRADER: Yes.

MR. RUZOW: So since we're further east, the location of the Rosenthal wells are further east, it would presumably take greater effort or result to be able to --

MR. TRADER: Greater than what we did.

MS. BAKNER: Steven, before you sit down, you mentioned that you also monitored Silo B which is also a backup source in the permit for the Pine Hill Water District now owned by the Town of Shandaken. Did you see any effects on Silo B?

MR. TRADER: We monitored the flow in Silo B during the test, and Silo B flow actually increased for a while during the test. There was no change in the yield of that spring during the test.

MS. BAKNER: What's the other primary source of the Pine Hill water supply?

MR. TRADER: Bonnie View Springs.

MS. BAKNER: Bonnie View Springs. Is that shown on there?

MR. TRADER: It's not shown on this cross section but it's in this area where PH-1 is located.

MS. BAKNER: How do you know that we

wouldn't have an impact on Bonnie View Springs?

MR. TRADER: Bonnie View Springs reflects water that is freely discharging to the surface by itself, regardless of any pumping. It's lost to the system. Once daylight enters the brook, it's gone to the groundwater system.

MR. RUZOW: It's gone from the groundwater system?

MR. TRADER: It's gone from the groundwater system to the surface water.

MS. BAKNER: Do the Bonnie View Springs contribute water to Crystal Spring Brook as well?

MR. TRADER: Yes, they do.

ALJ WISSLER: Dr. Gowan, it's your view that the view expressed by Dr. Michalski this morning with respect to this stratification of aquifers, you're saying that in your view, that is not the case in this area?

DR. GOWAN: It's really a combination, and I tried to make that clear. Your aquifer,

is really that upper part of the rock, it's the fractures in -- the fractured zone in the upper part of the rock. The way that this stacked system plays into this, is that as the water is coming off your hillside, coming through these fractures, when it comes to that --

ALJ WISSLER: You might hit some shale vein of some kind that causes some kind of spring to come out of the side of the mountain?

DR. GOWAN: Right. And the shale is fractured too.

ALJ WISSLER: But you're saying that kind of division of the aquifer, that's what it is; it's not some layer sandwiched between two impervious layers and stacked in that way?

DR. GOWAN: Right.

ALJ WISSLER: You're saying that's not the case?

DR. GOWAN: That's not the case. And I would elaborate on that a little bit. If you were going to say this is all a stacked aquifer, then in theory, you should be able to go right back through the mountain and find

these sandstones that have this moderately uniform permeability in each one of those units, such that each one is behaving as an aquifer, and you would see it in the valley bottom too. That's not what we see. We see the sandstone back in the mountain is very tight, isn't behaving like an aquifer at all.

MR. RUZOW: You described it as a band before that follows the topography of 200 to 300 feet?

DR. GOWAN: Right.

MR. RUZOW: It's within that band that

you describe the fractures as primarily occurring and interacting with each other?

DR. GOWAN: Yes.

ALJ WISSLER: Let me understand this. The water table, the surface of the water table generally follows the topography of the land?

DR. GOWAN: Yes.

ALJ WISSLER: But the aquifer does too; is that what you're saying? That there's this pretty much homogeneous aquifer layer that runs beneath the surface of the land and generally follows the topography also?

DR. GOWAN: The one thing you had right was the water table -- you had two things -- I want to start from that point. That water table is the surface. Now, the fractured rock beneath that water table, that's your aquifer.

ALJ WISSLER: Right. But you're saying that that is not in any way banded or isolated into distinct stratified aquifers?

DR. GOWAN: It is banded in the sense that --

ALJ WISSLER: Every once in a while, you might get a break out on the hillside?

DR. GOWAN: Right. As you're coming down that hillside, as you're moving through this upper 200 feet down the hillside through the fractured sandstone, and when you encounter this shale interval, it's forcing the water to come out.

ALJ WISSLER: At that point?

DR. GOWAN: Right.

ALJ WISSLER: But that shale isn't creating an impervious barrier that literally divides the aquifer and creates two levels of aquifer?

DR. GOWAN: No, it's not a -- it will allow some water across that, but not all of it.

MR. TRADER: If it was providing such a barrier, you would see flow coming out on that shale unit all across that elevation. Wherever that shale is coming out, you would see flow coming out. But the fact of the matter is, you don't see that. You do see the popouts every once in a while.

Drawing some hypotheticals in here. Your main flow is in this fractured rind. Occasionally you have a shale layer popping out at that one location, but perhaps not 100 feet away.

MS. BAKNER: Can you describe what a dip determination is, and whether you did any on-site? The dips that Dr. Michalski was talking about.

DR. GOWAN: Mr. Trader.

MR. TRADER: We took some measurements of the dip of the bedrock. The bedrock is not exactly laying flat. We measured it to be dipping at approximately one degree to the southwest. Those are the measurements that we

took.

Also, when looking at the state geological map, it shows that area. If you look at the formational contacts, it also, using that method, with elevation and contacts between two formations, you can use a three-point problem to determine it's also approximately a one-degree dip. So using the map method to determine the dip agrees with what we measured in the field.

MS. BAKNER: Dr. Michalski had a diagram showing the fracture in one of the Rosenthal wells that he postulated based on the well records. Then he showed some kind of a extension, if you will, out to some future point on Birch Creek. Can you address why you don't feel that's reflective of actual conditions?

MR. TRADER: Sure. There was a water yielding fracture that was found at approximately 185 feet in Well Number -- in R1 I believe it is -- Well R2 is where we found the fracture at 186 feet.

Now, an important thing that we need to note here is that this fracture -- if this

was a bedding plane fracture that we encountered at that level, and if it was this extensive that it would extend all the way back to Fleischmanns, we, in fact, did not see that same fracture only a couple hundred feet away at Wells R1 and R3. There was no fracture viewed in any water at that depth.

So that's telling me that this is not that pervasive of a bedding plane fracture. If it was, we would have encountered it right there at the well field in all locations.

If you extrapolate -- if this was a bedding plane fracture and you extrapolated it in an up-dip manner, let's say one degree, to where it would intersect towards the east, where it would intersect the base of the overburden, it would be in contact with approximately 80 feet of clay or till, which as we heard before from testimony, is a very low permeability unit.

So it's -- for the water to be going from Birch Creek through this very low permeability clay and till and hitting this bedrock fracture and making its way down to our well field within the 72-hour pumping

test -- I doubt that that would happen.

MS. BAKNER: For the record, we're referring to CPC Exhibit 80, page 18 entitled, "Distant Recharge from Birch Creek to Supply Well R2." In your opinion, this doesn't bear any resemblance to reality?

MR. TRADER: No.

MS. BAKNER: Is there anything you

would like to add to that?

DR. GOWAN: No.

MS. BAKNER: There's been a lot of comments and concerns about the water budget analysis, Mr. Trader. I know that you have prepared a response to these questions, and that can be found on Applicant's Exhibit 122. It's a July 28, 2004 letter to Alex Ciesluk.

And I guess what I'd like you to do now is address for me first, if you will, Dr. Michalski's comment that the annualized water budget analysis is not useful for looking at recharge in this area.

MR. TRADER: Doing a water budget analysis, looking at the soil types and their moisture capacities and the permeabilities of these soil types is vital to a water budget.

It's part of how you determine how much water ends up percolating into your underlying aquifer, in this case, the fractured bedrock aquifer.

MS. BAKNER: How many water budget analyses have you done for projects during the time you've been with Alpha Geoscience; ballpark?

MR. TRADER: Ballpark, less than 10.

DR. GOWAN: I would like to add something here, your Honor. We do a lot of different kinds of water budgets and we apply different approaches depending on how large they are and what kind of objectives there are, and some of them are basin-wide analysis.

If we're looking at, say -- if we're looking at a basin, for example, Saratoga Lake is looking to use their -- the City of Saratoga wants to use their lake as a water supply. And what they look at there -- what we had to look at there was streamflow, basin-wide streamflow and flow analysis.

In this case, in our site-specific case, we want to know what our project is doing to the water balance in specific. And

the only real way to do that is to look at the site-specific characteristics -- and soils are a very important part of the site-specific characteristics -- pertaining to whether it's going to runoff or you're going to evaporate or it's going to recharge.

So soils are a critical piece of this. And I was a little surprised this morning to hear that soils are unimportant, because really the basis of this, in theory, was in the landfill work, started several decades ago in which they were looking at different types of material on top of waste and trying to determine what percolation rates would be through those soils, determine what the leachate quantities would be. And that was really the theoretical beginnings of this.

And there's been a fairly substantial amount of good research on these aspects. So

I think it is very important. It's very important to look at the site-specific conditions in order to determine what your project impacts are. And that's what we did.

MS. BAKNER: Can you describe for me what you did as part of the water budget

analysis.

MR. TRADER: The purpose of the water budget analysis that we did for Big Indian and the Wildacres, the overall purpose was to see what effect the project development is going to have on groundwater resource area. Was there going to be a net negative effect, or a net positive effect.

What we looked at was -- I guess we should really get into maybe what the water budget reflects. It's a water balance. Precipitation comes down. It is either evaporated or evapotranspirated or it becomes percolation or it becomes runoff. Whatever doesn't runoff or get taken up by plants or evaporate into the sky ends up in percolation. And percolation is recharge to your aquifer system.

So we wanted to see -- by developing the projects, were we going to negatively or positively impact the potential recharge that was available.

MS. BAKNER: Let me ask you this, Steve, just to put it in perspective: If we had a negative effect, what kind of things

could happen?
MR. TRADER: A negative effect, meaning there's less recharge to the groundwater system, that would mean there would be either an associated increase in runoff or an increase in evapotranspiration.
MR. RUZOW: Or less recharge into the ground?
MR. TRADER: Right, that's where it started. If we had a negative impact, in this regard, it would mean a lower recharge into the ground. That would mean less water would be available potentially, depending on how much you affected it. Less water would be available to groundwater wells and to springs.
MS. BAKNER: So we specifically did this to determine if we were going to have an adverse effect on groundwater inputs to the system. Would there be less water in Bonnie View Springs, would there be less water in the Village of Fleischmanns -- that was precisely what we were trying to find out?
MR. TRADER: Right.
MS. BAKNER: How did you compare the pre- and post-conditions? What type of

information did you use to do that?
MR. TRADER: We used precipitation data, we used soil information that was obtained from the soil surveys that are

published for the local area.
ALJ WISSLER: What precipitation data did you use?
MR. TRADER: For the water budget purposes, we used the data from Slide Mountain.
MS. BAKNER: Why did you use the data from Slide Mountain?
MR. TRADER: Slide Mountain is the closest NOAA, the National Oceanographic Atmospheric Administration. They maintain weather stations across the country.
These have high quality control on the data, so the Slide Mountain station was the closest to most of the project area. It also is at a similar elevation. It's not on top of Slide Mountain; it's on a shoulder of Slide Mountain, approximately the same elevation right within what our project area is.
Slide Mountain data was a continuous record. What we looked for is at least 30

years of precipitation and temperature data from a single station, and Slide Mountain fit that bill. None of the other stations around that area met our criteria for doing water budget analysis.
ALJ WISSLER: That 30-year standard, is that some protocol within the industry or is that your choice?
MR. TRADER: That's defined as the normal.

ALJ WISSLER: By who?

MR. TRADER: By NOAA.

DR. GOWAN: They define that. That's how they calculate their averages, what they call the normals. When you watch the weather report and they say what the average is for this day, it's based on that 30-year average.

ALJ WISSLER: Okay. So NOAA -- there's some protocol within NOAA's rules and reg.'s with respect to the development of a water budget, and they say use 30-year data?

DR. GOWAN: No. What we want to do is if we're going to do an average -- what we're looking for is a change from a beginning -- from existing to future. And we want to use

data that we feel appropriately represents the general characteristics of that site, and the 30-year average, that average is -- we feel is representative of that site.

MS. BAKNER: I would just draw your Honor's attention to page 8 of Applicant's Exhibit 122 where the climate data and station requirements are described in a little bit greater detail.

Mr. Trader, I think you referred to the World Meteorological Organization defining climatic normals as the arithmetic mean of a climatic element computed over three consecutive decades. So there is a definition of what this is and why you use it? You didn't just pull it out of your hat.

MR. TRADER: It's the most recent 30 years. It's to recognize any changes through time that may be occurring to general weather patterns.

MS. BAKNER: Was the temperature data at the NOAA station, was that available at other stations?

MR. TRADER: Temperature data was available at Slide Mountain, it was available

at other stations that might be further away -- closer stations might not have had a continuous record of temperature and/or precipitation.

MS. BAKNER: A lot of discussion has taken place with respect to the Belleayre ski station data, and I just direct you to page 10 there. What was it about the Belleayre ski --

ALJ WISSLER: Page 10 of --

MR. RUZOW: Exhibit 122.

MS. BAKNER: What was it about the Belleayre ski station data that you felt made it less suitable than the NOAA data?

MR. TRADER: A couple of things. One was primarily, they didn't have a 30-year record; they only a 12-year record of precipitation -- 1992 through 2003. This is not a long enough span of years to calculate climatic normals.

There were also some discrepancies in some of the monthly data. We use monthly data

for water budget purposes. There was a
discrepancy that I saw in some of the monthly
data that was sent to me by the personnel at
the -- it's operated by the Acid Rain

Monitoring Program from the DEC. They sent me
the data. Some of that monthly data had
discrepancies with monthly data that was
available on their website.
I had the daily precipitation as well,
and there was no way in that record to tell
whether or not a data point was missing or if
it was just zero rainfall. It simply said
zero. I called them on this and said: Does
the zero mean no precipitation or does it mean
that you didn't get anything on that day? And
he said: Well, there's really no way of
knowing that.
So these discrepancies led me to steer
away from the Belleayre Ski Center data.
MS. BAKNER: How does NOAA show that
data, just for comparison purposes?
DR. GOWAN: 999, or something like
that.
MR. TRADER: I believe negative 999
indicates missing data. If there's ten days
in a month, it will be one symbol. If it's
missing over 50 percent of the month, it will
be another symbol. So it gives you an idea of
how good the data is.

MS. BAKNER: So from a scientific standpoint, it's just more standardized and it's more reliable?

MR. TRADER: The quality control is much better. Plus the intent for the Acid Rain Monitoring Program is not just to determine what is rainfall. They want to know -- they have a certain criteria, a certain amount of data needs to be collected in order for their analysis to be important for them. It's a different purpose.

MS. BAKNER: Based on the water budget analysis you did using the NOAA data, what was your conclusion as a result of evaluating all that data?

MR. TRADER: There was going to be no negative impact to the recharge to the groundwater system based on the development of the project.

MS. BAKNER: What do you attribute that "no negative impact" to; what characteristics of the project do you believe lead to that conclusion?

MR. TRADER: A couple of them. Creation of the golf courses is one

significant part of that. It's not like you're just cutting down trees and planting grass. What's happening is you're cutting down trees, but then you're modifying the landscape. Many areas of the slope are going to be not as steep any longer. So your runoff -- the runoff extent is not as much as it would be without that.

Another aspect is the material that they're going to bring in to build the fairways and greens and tees is going to be a certain spec., a sandy loam.

MS. BAKNER: Sand and organic material.

MR. TRADER: Right. So according to that, that would have an increase in the amount of permeability for the soils there. So you would increase your recharge there.

We need to say that in typical dry seasons, the soil moisture goes away and starts to diminish, so you have this hard, dry soil. By irrigating, you're going to alleviate some of that. You're not going to suddenly dry out your soil. You want to keep your soil nice and moist so you can grow

grass. That is going to have an increase in the amount of recharge to the groundwater system.

MS. BAKNER: In addition to the change in topography and the new, more permeable soils being brought onto the site, is there anything else that would contribute to the results that you obtained?

MR. TRADER: I think those are the two main factors.

MS. BAKNER: You did mention

irrigation as a part of the whole change in the site. When you calculated the water budget, when you looked at that, did you add in as inputs to the system the recycled effluent or irrigation -- or general irrigation water?

MR. TRADER: No.

MS. BAKNER: So how would that affect your results?

MR. TRADER: That would make the results be more positive. There would be additional infiltration, percolation to the groundwater.

MS. BAKNER: So the only thing that

would do is make more water available for water supplies, you know, down the mountain and everything else?

MR. TRADER: Correct.

MS. BAKNER: Now, you feel -- I don't mean to say feel, I'm sorry. As a scientist, you believe you chose the right data in using the NOAA station data from Slide Mountain, but at the request of your lawyers, who aren't scientists, did you do another type of analysis in response to some of these criticisms?

MR. TRADER: Yes. We reran the water budgets for Wildacres and Big Indian using Belleayre Ski Center data, which is roughly -- it's a little more than half of the -- the drought actually, we used the drought -- the lowest annual precipitation that was reported at the Belleayre Ski Center was 1988, I believe it was -- 1991 had the lowest -- I'm sorry.

ALJ WISSLER: What are you reading from?

MS. BAKNER: Table 1, page 11 of Applicant's Exhibit 122. The table shows the

annual precipitation values at Belleayre Ski Center.

MR. TRADER: It's roughly half the precipitation of Slide Mountain's annual normal. The normal precipitation at Slide Mountain is approximately 62 inches now. At the time of the water budget that we did initially, it was 60 inches, but we've gone into a new millennium.

But the Belleayre Ski Center, the driest year looks like 1997, it's about 30 inches of rainfall during the year. So we used the monthly rainfall data from Belleayre Ski Center for that, what I'll call a drought year from 1997, and reran both water budgets with that.

MS. BAKNER: The only variable you changed was the rainfall precipitation -- maybe temperature, I don't know?

MR. TRADER: No.

MS. BAKNER: You kept the same temperature?

MR. TRADER: The drought year that we used was 2001, the Belleayre Ski Center for the re-analysis of the water budget. From the

daily records of the Belleayre Ski Center, 2001 was 32.95 inches. That's information that was supplied to us from the DEC.

MS. BAKNER: So you reran the analysis with the new rainfall numbers and what was the conclusion?

MR. TRADER: The conclusion was very similar to what it was initially, that you would have no negative impact under that scenario to the groundwater recharge.

ALJ WISSLER: Where is that worked out?

MS. BAKNER: That is page 13 through page 16.

ALJ WISSLER: Applicant's 122?

MS. BAKNER: Yes, it's all set forward there.

Can you explain in layman's terms why having much less water doesn't have an impact on the results of the water budget?

MR. TRADER: You're starting out with whatever particular number that you're starting out with, and that's a precipitation number. If you're starting out with 60 inches of rain, a portion is going to go, like I

said, to evapotranspiration, a portion of it is going to runoff, and a portion is going to go into the ground. If you start out with 30 inches, the same situation is going to happen.

So when we use those numbers, we're looking at a before-and-after situation, so we're still using those drought numbers in the before scenario, before development scenario existing conditions, and we also used the same values in the post-development, this is full development situation.

MS. BAKNER: Let me ask you this: Did we use the water budget analysis in any way to justify the quantity of water we could withdraw as part of the Rosenthal wells?

MR. TRADER: No, we did not.

MS. BAKNER: Is a water budget analysis ever used for that purpose?

MR. TRADER: It could be.

MS. BAKNER: Which is the better method of determining how much water you can withdraw from the system?

MR. TRADER: A pumping test is a good way to do it.

MS. BAKNER: To the both of you then: The purpose of the water budget analysis and the pumping tests in this case were different, and maybe if you could address that a little bit in terms of the work that you've done on other projects?

DR. GOWAN: Water budget is very

commonly used, like we used it here, to evaluate what the impacts of the project will be on water balance. You can use them in some situations to determine if you have enough recharge in a particular aquifer to determine whether you have enough volume available for a given pumping scenario. But this is the more typical way that it's used.

MS. BAKNER: Are you confident that the results you obtained from both analyses are actually reflective of the conditions that are going to occur during the site?

MR. RUZOW: Post-development.

MS. BAKNER: Post-development?

MR. TRADER: I think the result that indicates that there will be no negative change is consistent with that, yes.

DR. GOWAN: Yes, we're confident.

MR. GERSTMAN: I didn't hear that.

MS. BAKNER: Dr. Gowan, could you repeat what you said.

DR. GOWAN: I said yes, we are confident.

MR. GERSTMAN: Mr. Trader, I didn't hear what you said.

MR. TRADER: I said that there would be no negative change to the recharge in groundwater, yes, we're confident in that.

MS. BAKNER: Is there anything else you want to add into the record, Steve, relative to your July 28th letter on water budget, irrigation and precipitation?

MR. TRADER: Not at this time.

MS. BAKNER: Do you have any other questions on that, your Honor?

ALJ WISSLER: No.

MS. BAKNER: To return to your other letter dated July 28th, 2004, this is a response to comments made by Mr. Habib. And I guess we did respond the day that Mr. Habib gave his testimony; and I would just like you to indicate, is there anything different or new in this letter than what we had responded

to previously as far as Mr. Habib's testimony?

MR. RUZOW: The letter being referred to is Applicant's Exhibit 98.

MR. TRADER: I don't remember the specific answers to some of those things that were provided at the time. I'm not sure if one of these letters was referenced at that point.

MS. BAKNER: Let's just go through it generally then, and we can point to the exhibits that we have with respect to the flow meter because I would like you to go over that and show the Judge the flow meter in case he has any questions.

So the first point that Mr. Habib made was that there were differing versions of a particular Table 1A. If you could just briefly explain how that came about.

MR. TRADER: We discovered -- the first version of Table 1A contained flow data from streams that were collected with a flow meter that Sam is going to bring over here in a minute.

ALJ WISSLER: How much longer are you going to be, because it's quarter of five?

MS. BAKNER: A while.

ALJ WISSLER: How long is a while -- how late do we want to go today?

MR. RUZOW: Off the record.

(4:45 P.M. - DISCUSSION OFF THE RECORD.)

ALJ WISSLER: We're going to take Ms. Bianconi and then we'll break for the day.

MS. BAKNER: Mary Beth Bianconi's resume is included in the exhibit list.

Mary Beth, if you could just briefly go over your qualifications, and in particular your connections to this project.

MS. BIANCONI: I have a Bachelor's Degree, and I have credits towards a Master's Degree in Environmental Planning. I've been doing planning and permitting for engineering projects for about 14 years, and I was the project manager at Delaware Engineering for the water supply and wastewater disposal aspects of the Environmental Impact Statement for the Belleayre Resort.

MS. BAKNER: In addition to working on the Belleayre Resort aspect of the project, did you fulfill any role or function with

respect to the modification of the Pine Hill water supply permit?

MS. BIANCONI: I worked as the project manager for the modification of the Pine Hill water supply permit, as well as for the evaluation and the design of improvements to the Pine Hill Water System for the owner, Mr. Gitter.

MS. BAKNER: What has your connection and Delaware Engineering's connection been with the Village of Fleischmanns?

MS. BIANCONI: For the Village of Fleischmanns, Delaware Engineering has provided two services; one is conducted a value engineering and then a redesign for the Village's wastewater treatment plant, which is being funded by the City of New York as part of the new infrastructure program.

The system had been designed -- it was about to be put out to bid. There were concerns about the price adequacy of the system that had been designed by another engineer. Delaware Engineering was hired to conduct value engineering, and redesign and rebid the system, which they did. It was a

wastewater treatment plant and collection system, and that is now under construction.

In addition to that, Delaware

Engineering provided analysis and an evaluation of the Village of Fleischmanns' water supply system for the use of the Village for the purposes of making improvements to the Village's water supply system -- absent the Belleayre project, it was a separate project done for the Village.

MS. BAKNER: I guess what I'd like you to address first is the -- there have been allegations that the use of the Rosenthal wells or the use of Silo A will have -- by the resort -- will have an adverse effect on the water supply owned now by the Town of Shandaken and operated for the benefit of the former Village of Pine Hills, the Pine Hill's sewer district, if you will.

Could you please tell me if you are aware of any circumstances that would lead our use of those water supplies to cause any difficulties to the Pine Hill system.

MS. BIANCONI: No, there's no reason to believe at this point that there will be

any impacts of the use of either Rosenthal wells or Silo A on the Pine Hill system. The impacts of the Rosenthal wells were just discussed in great detail, or the potential impacts on the Pine Hill Water System.

Silo A I can address a little more specifically. The Bonnie View Springs are the only water source that is currently on-line serving the 128 customers that are part of the

Pine Hill water supply, and that's the only source that's been on-line since -- in the year 2000, Mr. Gitter purchased the system -- and for apparently sometime prior to that.

As previously discussed by Mr. Trader, Silo A currently flows into Crystal Spring Brook. The water is present, whether it's used for some other purpose or it simply flows freely. Therefore, the use of it by the resort will not impact Bonnie View Springs any more than its current flow that goes into Crystal Spring Brook impacts the Bonnie View Springs.

A little more about Silo A. It was originally constructed in the early 1990s. It was never owned by the Pine Hill Water

Company, and it was never permitted by the Ulster County Department of Health for public water supply use.

The Pine Hill Water System has been in existence for many years, over 100 years. In 1970, it received its first water supply permit, Permit Number 5889, which I'm sure is an exhibit.

MS. BAKNER: It's an attachment to some of the documents, and I'll identify that later for you, your Honor.

MS. BIANCONI: In that permit, it's not a -- what we call a modern water supply permit, it's a narrative style permit, and there is no total taking, per se, identified in that permit. The Pine Hill Water Company in 2001 submitted a permit modification, which is WSA 10181, Applicant's Exhibit 56, I believe.

MS. BAKNER: That was the permit modification that resulted from the application. The application is included as Exhibit 120. It's the Pine Hill Water Company Application for Modification of a Public Water Supply Permit. Also included in here is all

the letters and comments that make up the record, as much as we were able to locate them, that make up the record of DEC's determination to issue the public water supply permit modification.

MS. BIANCONI: That public water supply permit modification was sought by the Pine Hill Water Company in conjunction with an application for State Revolving Loan Fund monies, and improvements that would occur to the Pine Hill Water System.

In order to secure SRF funds, State Revolving Fund money, you have to have a valid water supply permit. And given the age of the prior water supply permit, the Department of Health and the environment conservation -- I'm sorry, the EFC, Environmental Facilities Corporation that administers the SRF program determined that an updated water supply permit needed to be secured. The purpose of that modification was to document and permit the sources.

The Ulster County Department of Health is the entity that has -- is the agency of primacy over public water supplies in Ulster

County, and the application sought their approval, as well as DEC's approval, for Pine Hill Well Number 1, Silo B Station Road Spring, Station Road Well; and in addition, just to maintain the current permit that was in existence for the Bonnie View Springs.

MS. BAKNER: There was also -- just let me add in here -- there was also later on an agreement to add Silo B as a potential -- unhooked up -- but a potential source for the system that came to be owned by the town, and that's also covered here in Applicant's Exhibit -- it's one of the Applicant's exhibits which is a letter to Alec Ciesluk, and it details the fact that there's a lease between the Silk Road organizations and the Pine Hill Water Company, allowing the Pine Hill Water Company to use Silo B.

So it was a lease. Then when the system was transferred to the town, the town purchased Silo B. So that's how it came to be part of the Pine Hill system.

MS. BIANCONI: In addition to documenting and permitting the sources, another purpose of submitting the water supply permit modification was to provide a current demand estimate, as well as do some projected future demands.

The projected future demands were required by the Ulster County Department of Health, and there was a lot of back-and-forth regarding the methodology that should be used to determine those values.

The current demand was found basically using the meter reading, which we discussed the last time I was here, where there was a flow meter in the existing Pine Hill water treatment system. Water flows through it, every day the operator writes down the value, they subtract it from the day before, and they can determine how much water is used by the system on a daily basis. And those records are very detailed and have been provided in another exhibit.

In addition to that, a future demand calculation was made -- what was done was the housing stock, the existing housing stock was evaluated based on the most current census data. Looked at the average number of persons per the occupied houses, did a little map with

(WATER SUPPLY, GROUNDWATER & SURFACE WATER ISSUE)

the unoccupied houses, and came up with what it would be if you took the average number of people and put them in all of the houses, not just the occupied houses. That was one evaluation.

In addition to that, the GIS information that's available from the City of New York was used to determine how much other available land there was in the village, look at zoning and then take the current zoning and figuring out what the highest and best use for each of the vacant parcels on the land could be. Figure out how much demand those would add to the system as well, basically a full buildout scenario under existing zoning and existing housing stock, including vacant and occupied.

MR. RUZOW: You used the word "village." You meant former village?

MS. BIANCONI: Former village, which is the approximate boundary of the service area of the Pine Hill Water District. That resulted in a value, future demand value, of 211,000 gallons per day.

MS. BAKNER: And that, your Honor,

that's all set forth in Applicant's Exhibit 117, and the information regarding Silo B is in Applicant's Exhibit 116.

Let me just ask you a quick question: In your experience, what was the Ulster County Department of Health's goal in having you do this sort of unusual evaluation of the future -- of the likely future needs of the Village of Pine Hill? Hamlet.

MS. BIANCONI: The Ulster County

Department of Health had taken the position for some time that they need to protect their communities from diminished economic capacity.

One of the ways that they look at that is they say you shouldn't reduce the amount of sewage capacity that the community has or water capacity, those types of things, but they also understand that those numbers have to be realistic, they have to be supportable. You can't pick numbers out of the sky; they have to be something that's documented and supported based on good engineering practice.

When the Pine Hill -- wastewater treatment plant, which was owned and operated by the City of New York, was being

reconstructed -- updated in the mid-1990s, Ulster County Department of Health was a very vocal supporter of keeping the capacity of that plant the same.

The original capacity was based on evaluations done in the 1920s. There was quite a lot more population in Pine Hill, and quite a lot more seasonal population in Pine Hill, resulting in a quite large capacity that the City was required to provide to the then village, now hamlet.

The water system -- a similar position was taken by the Ulster County Department of Health. Dean Pallen, is the Director of that department, went through detailed analysis with us in terms of looking at making sure that the village's future ability to grow and develop was not limited by the total taking of water that would be on this water supply permit since the previous permit in 1970 didn't have a total taking, as we think of it today as a permit perspective.

MS. BAKNER: Bonnie View Springs, you mentioned earlier, currently supplies all the water needs of the district, the Pine Hill

District. In addition to the Bonnie View Springs, what other sources are available to them to come on-line to provide more water in the future?

MS. BIANCONI: In terms of the permit or in terms of what there's physically connected to the system right now?

MS. BAKNER: I guess I mean in terms of the permit primarily because they have assets that are not currently hooked up?

MS. BIANCONI: Correct. Their permit currently lists Pine Hill Well Number 1, it lists Station Road Well.

MS. BAKNER: Here you go, Applicant's Exhibit 56.

MS. BIANCONI: So Bonnie View Springs, Pine Hill Well Number 1, Station Road Spring. Those are the -- I'm sorry, and Station Road Well in addition. There are four sources.

MS. BAKNER: Look at special condition 1.

MS. BIANCONI: Special condition 1 gives them the ability to bring Silo B on-line if they conduct certain tests and meet certain approvals of both the State Health Department

and the Department of Environmental Conservation.

MS. BAKNER: So right now they're serviced solely by Bonnie View Springs; they have additional sources of water, many of which aren't even hooked up yet.

Historically, particularly say within the past five years, what was the primary contributing factor to the water that was being used within the hamlet? Where was all the water going?

MS. BIANCONI: The Pine Hill Water System, not unlike most old water systems, 100 years old plus, had suffered from a lack of attention over the years, and had many, many leaks in the system, which were slowly in some respects identified and corrected after the year 2000 when Mr. Gitter took possession of the system. So the demand for the system dropped significantly from somewhere in the 180 to 200,000 gallon-a-day range on an average-day basis to about 80,000 gallons a day, current-day basis.

MS. BAKNER: That was due solely to the --

MS. BIANCONI: Corrections, to

replacements of pipes; fixing broken, leaky water pipes; fixing the service connections, curb stops, valves, those types of things that were done after 2000 after Mr. Gitter purchased the system.

MS. BAKNER: I would draw your attention, your Honor, to Exhibits 105, 106, 107, 108, 109 and 110, all of which relate to various determinations by the Public Service Commission regarding the extent of repairs that had been made to the system.

What happened was some of the residents who used the water supply brought a petition before the Public Service Commission seeking to have the Public Service Commission hold a hearing on the condition of the system. And the Public Service Commission determined that no such hearing was necessary. There was an additional request for rehearing which was denied, and there was no further activity with respect to that.

We've included all this in the record to demonstrate that the system was in terrible repair when Mr. Gitter purchased it, and that

the findings in the Public Service Commission were that under his ownership, it was substantially improving -- far from completely improved -- and that the efforts of the then current owner, Mr. Gitter, to obtain funding were viewed as positive.

Mary Beth, if you could just go over that. Were they successful in obtaining any grants or anything?

MS. BIANCONI: They were successful in obtaining a grant and loan package from the State Revolving Loan Fund. I believe it totaled about 1.2 million dollars. My recollection is that about $700,000 was a grant, the remainder was a loan, which resulted in a significant benefit to the 128 users in the system. It reduces the cost to them over time to pay for those improvements. So they were successful in receiving that grant.

MS. BAKNER: Based on your experience in working with other communities in obtaining such grants, would it have been possible to fix the system and charge the users of the system absent these grants and loans?

MS. BIANCONI: No, the reason that there is -- the program that allowed the Pine Hill Water Company to get a grant as opposed to a loan is called a hardship program.

And there's a mathematical formula that's used based on percentages of median household income in the service area, whereby the federal government determines, somewhere along the line, every year what a reasonable cost of water service is to people in different income brackets, and median household income is the standard that's used.

Given the median household income of the hamlet of Pine Hill, they were able to apply for and receive a grant for 75 percent of the cost of repairing their system, which is very good money.

MS. BAKNER: Subsequent to obtaining the permit, did you continue to be involved in the design of the system on behalf of the Pine Hill Water Company?

MS. BIANCONI: Yes.

MS. BAKNER: -- at some point there was an agreement to transfer the Pine Hill Water Company assets to the Town of Shandaken.

Did you assist and help in that process?

MS. BIANCONI: Yes.

MS. BAKNER: And what was the result of that process?

MS. BIANCONI: The result of that process was that the Town of Shandaken purchase the assets of the Pine Hill Water Company. In addition to those assets, they also purchased an asset that was separately owned by a separate corporation known as Silo B, for their use.

MS. BAKNER: The petition to the PSC to transfer the assets, which is included in Applicant's Exhibit 109, includes a copy of the agreement among the town and Pine Hill Water Company. Applicant's Exhibit 110 is the Public Service Commission order approving the transfer.

Once the system was transferred to the Town of Shandaken and it became a sewer district within the town --

MS. BIANCONI: Water district.

MS. BAKNER: -- water district, forgive me, within the town, did you continue to be involved at all in that?

MS. BIANCONI: We were no longer involved in the process. We transferred the files that we had per the agreement to the town for their use in continuing to make improvements.

MS. BAKNER: Is there anything else you can tell us about the Pine Hill system or its ability to service the residents of Pine Hill?

MS. BIANCONI: The Pine Hill system is, you know by water supply standards, somewhat archaic; however, having said that, it's also a wonderfully efficient system. The springs present water. There's no pumping required. Whether they use the water or not, it's always present, it's always there. Whatever water they don't draw onto the system, they treat and send to the customers, goes into Birch Creek. That water would be present absent the Pine Hill Water System -- which is the same case with Silo A. Silo A sits there and discharges water to Crystal Spring Brook. Whether or not someone happens to put a pipe on it and tap it off, and send it someplace else.

It's a wonderful, beautiful system in Pine Hill. It's very simple. It doesn't require a high level of treatment. It is not a tremendous amount of variation in the flow from Bonnie View Springs, which is shown in the infamous Table 1A.

And it's a very good system for the community. It's relatively low cost. It doesn't require expensive filtration; it doesn't require a tremendous amount of chemical. It does, however, need to be upgraded, and the town is certainly aware of that. It needs to make some basic improvements.

Right now on a per capita basis, per-person basis, the system is using about 600 gallons per capita per day, which is extremely high. That means that there's quite a lot of loss. The Department of Health standard is about 100 gallons a day per capita.

So five times the amount of water is running through the system is being lost into the ground that replacing pipes and making other improvements could improve. But it's a

very good system.

MS. BAKNER: As far as you know, the

plans are still going forward to replace the antiquated -- the old distribution system?

MS. BIANCONI: As far as I know, the town was able to secure similar funding to what the Pine Hill Water Company had secured. In addition, the town had funding available from HUD, which is now called the Governor's Office of Small Cities, that they were intending to use for this purpose. And we transferred to them all of the records that we had of the engineering that had been done up to the time that the system was transferred for them to continue with it.

MS. BAKNER: Again, let me ask you one last time: Will the use of Silo A or the bedrock Rosenthal wells have any impact on the current -- on the system and the permit that was received by the Pine Hill Water District?

MS. BIANCONI: Based on the geologic analysis that's been done, and based on the current situation in setting in Pine Hill relative to Silo A and Bonnie View Springs, no.

MS. BAKNER: Are you confident that the Ulster County Health Department carefully insured that all of the future water needs of the hamlet or the district could be satisfied?

MS. BIANCONI: Within all reason that we can document, yes.

MS. BAKNER: Moving now to the system, the Village of Fleischmanns' system. The

Village of Fleischmanns has a water supply, and as related in the Draft Environmental Impact Statement, we're proposing to purchase water from the Village of Fleischmanns to be used by an independent water company for the Wildacres portion of the resort. And we have, from the Village of Fleischmanns, a letter of intent indicating their willingness to sell us water. Can you tell me a little about the Village of Fleischmanns' system.

MS. BIANCONI: The Village of Fleischmanns' system, not unlike the system in Pine Hill, is very old. It consists of three wells and a series of springs. Of those wells, currently two are on-line, one is off-line which is Well Number 1, has been off-line since the flood of 1996; and that's

the well that Dr. Gowan discussed earlier and there were the questions regarding the potential of groundwater drawing saline water in that well.

The springs and Well Number 2 and Well Number 3 provide all of the water sources for the Village of Fleischmanns, and have since the flood of 1996.

Historically, the Village of Fleischmanns, between a combination of pumping wells and taking water from their springs, served or provided, treated, 250,000 gallons of water a day on average, which is a very large number given that the full-time, regular population of the village is 351 people. That would indicate that there were significant leaks in the system, which is not surprising with a water system that's 100 years old.

In 2001 and 2002, in conjunction with the work that the Village was doing relative to their new sewer plant, they were going to put in sewer lines -- needed to identify where all the water lines were so they can provide a separation between the sewer lines that were going to be constructed and the existing water

lines.

They very, very wisely, in addition to identifying them, also had the company that did that work, identify where there were major leaks. They repaired a number of major leaks, and the system use dropped and stabilized from its former 250,000 a day on average to about 72,000 gallons a day on average.

MS. BAKNER: I want to note that those records are included in Applicant's Exhibit 51D, which is the Conceptual Design Report for the Wildacres Resort. There were some records included previously, but I think in this document we have put the entire set, which shows the reduction in the water usage, and the fact that it's been constant and that it hasn't gone back up for a substantial period of time.

MS. BIANCONI: Again, we look at

engineering, good practice rules of thumb, go back to about 100 gallons per day per capita per person. There was about 350 people who live in the village, that would equate to -- given their current water use of 72,000 gallons a day average -- about 200 gallons per

day per capita.

So they still have some excess use in there, but it's significantly better than 250,000 gallons a day, which is what they were previously pumping and taking from their springs, basically sending into their distribution system, losing the vast majority of it.

And the reason why we know it was lost is because the entire system is metered in the Village of Fleischmanns. They have metered records. They can go and look and see exactly how much each service connection is used. They were billing somewhere in the neighborhood of 40,000 gallons and yet pumping and treating 250,000 gallons.

So it was significant loss, and they have rectified that to a great extent. There's a source versus demand table which is --

MR. RUZOW: 123.

MS. BIANCONI: Applicant's Exhibit 123 is the Wildacres Source Versus Demand Calculation which shows the capacities as tested by Alpha Geoscience of the three wells

and the springs, and it also shows the demand that the Village currently uses on an average-day basis, shows their maximum day of demand, and then it also shows those in combination with the demand that would be expected from the Wildacres Resort relative to an average day and a maximum day.

Given this analysis, there is enough water within the existing system to meet all of the applicable regulatory standards that have been previously discussed in terms of Ten State Standards to meet both the demand of the Village and the demand of the resort combined.

And just interesting to note, that combined demand is on an average-day basis about the same as the prior village demand when they had not fixed all their leaks. It's about 250,000 gallons a day.

If we were looking to see if there were going to be impacts from the resort using water from the Village of Fleischmanns' system, we have no further to look than back a couple years ago before they fixed their leaks to see that when they were drawing 250,000 gallons a day, what were the impacts,

what were the impacts on Emory Brook, and what were the impacts -- there didn't appear to be any because that demand, the new demand of the Village, combined with the demand of the resort, is going to equal the former demand of the Village alone.

MS. BAKNER: Is there anything else you want to add about the system for the Village of Fleischmanns?

MS. BIANCONI: The Village of Fleischmanns -- the only other thing I'll add -- is in a very similar position to the Pine Hill Water District. The Village of Fleischmanns has also applied for and received -- they received low-interest loan funding from the State Revolving Fund to upgrade and improve their system as well. And they are looking at adding additional storage capacity, replacing a number of pipeline that has not been replaced or repaired recently, and treatment improvements.

MS. BAKNER: What benefits will the Village of Fleischmanns glean from selling the resort water?

MS. BIANCONI: The Village of

Fleischmanns will glean quite a number of benefits, mostly which are economic. The resort is proposing to take raw water, untreated water from the Village system that would be supplied to the resort, and the resort is a public water supply with its own under the PSC -- and with its own water company -- would be required to treat that to standards and then handle all the customer billing and customer complaints and any of the other things that go on with being a public water supplier.

The Village's only responsibility would be to provide that raw water to the resort at a cost. That cost is a rate that's set by the Village. It can be changed at least annually.

Frequently, it's often the case where the resort is considered an out-of-district user, the resort will be outside of the exiting village, so the village can charge a little bit more money on a per-gallon or per-thousand-gallon basis.

All of that revenue comes back to the Village to basically cover their cost of

electricity for the pumping -- that's really their only cost -- they're going to have to have a well pump and they're going to have to pump it to get it up the hill to the treatment system for the proposed resort. It would cover their electric cost, but it would far exceed that. It's money to their bottom line. It's a revenue source, which again will help them subsidize the improvements that they need to make in their system.

MS. BAKNER: Mary Beth, are you aware of any other user or potential user, like Belleayre Resort, that would be in a position to purchase water from the Village of Fleischmanns?

MS. BIANCONI: I'm not aware of any, no.

MS. BAKNER: So this is kind of a unique opportunity?

MS. BIANCONI: It appears to be, for the Village.

MS. BAKNER: Mary Beth, one of the sources that the Village of Fleischmanns has used in the past up until the flood of 1996 was Well 1, I believe.

Looking at the draft permit proposed to be issued by the Department, there's a specific condition that applies to that, and I just want to -- here is the Wildacres Resort one -- Special Condition Number 1?

MS. BIANCONI: Special Condition Number 1 of that draft permit for the Wildacres Resort requires that Fleischmanns Village Well Number 1 be rehabilitated or replaced and reconnected to the water system.

Essentially Fleischmanns Village Well Number 1 is located very close to Emory Brook, and in the flood of 1996 the transmission line that runs from that well into the system was separate -- was broken, crushed or otherwise prevents water from now going from the well into the system.

In addition to simply replacing that, more studies will need to be conducted before that well will be brought on-line after it has been rehabilitated and replaced.

In determination of the potential influence of surface water into the groundwater, we need to be connected as it would be with any public water supply well.

In addition to potentially rehabilitating that well, there's also quite a bit of public property in an area where a new well could be drilled that would replace it, which would provide for modern well drilling techniques. You would have full records of the construction of the well, as the existing well is quite old and there are not available records as to its construction in terms of depth of the casing, those kinds of things.

So there are several opportunities there to bring Well Number 1 back on-line.

MS. BAKNER: Right. Our proposal at this point is to rehabilitate the connection with Well 1 and the rest of the system?

MS. BIANCONI: Right.

MS. BAKNER: There have been some criticisms that we haven't done the same number of extensive, expensive groundwater pumping tests for the Village of Fleischmanns system. As an environmental professional, is there some reason why that's the case?

MS. BIANCONI: The Fleischmanns system is a currently active, operating system. When tests were conducted, even if tests were to be conducted today, there are limitations. It's an active system. You can't take certain resources off of line and still maintain supply to the village, primarily because they lack storage. Most systems have at least a day of storage, if not two days of storage.

The Village of Fleischmanns' system lacks that storage volume, that storage capacity, leaving basically an inability to take the water resources off of line for any period of time other than very briefly -- to conduct the types of tests that have already been conducted.

MS. BAKNER: Given what you told us about the amount of water that was previously just flushed through the system, would any reasonable person think that there's not enough water here to supply the resort?

MS. BIANCONI: If you were to add the total volume of the water resources, you're well over 550,000 gallons of water a day available to the system. The resort is, arguably, using 190,000 gallons a day that's maximum, the village is using 180,000 gallons a day that's maximum. There's still more than

adequate capacity remaining in the existing water resources to serve both those demands.

MR. RUZOW: Without storage?

MS. BIANCONI: Storage is a requirement, at least 24 hours. That's one of the reasons the Village is updating their system; their storage capacity is limited right now. I believe it's 80,000 gallons. So that's pretty marginal, considering their use is about 72,000 gallons. So they want to increase that, increase the location -- put a third storage in a better location.

MR. RUZOW: That's all part of the plans for the improvement to the Village system?

MS. BIANCONI: Village system, which would be happening regardless of whether the Belleayre project is occurring or not. They simply need to comply with current standards.

There's a long regulatory history, which I believe is in 51D, from the Department of Health, the Oneonta District Office of the New York State Department of Health, long-standing letter writing and mandates to the Village long prior to the Belleayre Resort

even being conceptualized. They need to make their system to comply with current standards.

MR. RUZOW: With respect to the Fleischmanns system as distinct from Pine Hill, the State Health Department is the lead agency with respect to Fleischmanns?

MS. BIANCONI: That's correct. The Village of Fleischmanns is located in Delaware County which does not have a County Department of Health; therefore, the agency of primacy is the New York State Department of Health, the

Oneonta District Office.

In Ulster County, there is a Department of Health, and the State Health Department defers to the Ulster County Department of Health for these types of improvements. They work together.

MS. BAKNER: Anything else you want to add?

MS. BIANCONI: No.

MS. BAKNER: That's it.

ALJ WISSLER: Okay. Thank you. We will at this time adjourn until tomorrow morning.

(5:44 P.M. - WHEREUPON, THE ABOVE

PROCEEDINGS ADJOURNED FOR THE DAY.)

C E R T I F I C A T I O N

I, THERESA C. VINING, hereby certify and say that I am a Shorthand Reporter and a Notary Public within and for the State of New York; that I acted as the reporter at the Issues Conference proceedings herein, and that the transcript to which this certification is annexed is a true, accurate and complete record of the minutes of the proceedings to the best of my knowledge and belief.

THERESA C. VINING

DATED: September 1, 2004.