STATE OF NEVADA, DEPT. OF CONSERVATION & NATURAL RESOURCES

STATE ENVIRONMENTAL COMMISSION

SEC APPEAL HEARING:

CONTESTED CASE - NAC 445B.875

EUREKA MOLY

TRANSCRIPT OF PROCEEDINGS

BEFORE THE CHAIR E. JAMES GANS

WEDNESDAY, SEPTEMBER 4, 2019

9:00 A.M.

RICHARD H. BRYAN BUILDING

901 SOUTH STEWARD STREET

CARSON CITY, NV 89701

APPEARANCES:

E. James Gans

Tom Porta

Kathryn Landreth

Henna Rasul

Val King

Jane Boomhower

Daniel Nubel

Katie Armstrong

Frederick Perdomo

Julie Cavanaugh-Bill

John Hadder

Matthew Schulenberg

Christine Olson

Brent Johnson

Todd Process

Susan Juetten

Houston Kempton

Glenn Miller

GANS: Okay. We'll begin this State Environmental Commission hearing this morning. I'm going to read some things into the record. I want to make sure the record is very, very concise on this.

(Telephone ringing)

GANS: That's me. I will shut it off. Thank you very much.

LANDRETH: Yeah. As a reminder, will everyone please turn off their cell phones?

GANS: Let's try this again.

PORTA: I think mine's off.

GANS: I want to read this into the record because I want to make sure the record is really, very clear and we have everything that we need in the record. What I'm going to do is go over our procedure also. I'm going to read that so everybody knows exactly what to expect today how we're going to proceed. So bear with me please while I do this.

My name is Jim Gans and I welcome you all here. It's a beautiful morning. We couldn't have picked a more pretty day to do this. I'm Chairman of the State Environmental Commission. Joining me today are two other members of the Commission, Mr. Tom Porta and Ms. Kathryn Landreth. So you've got a great panel here. I hope you all know that. I hope both party (sic) knows that.

For the record, this appeal hearing is being convened at 9 a.m. on Wednesday, September 4th, 2019 at the Richard H. Bryan Building located at 901 South Stewart Street in Carson City, Nevada. This hearing is open to the public and an agenda for today's public hearing -- appeal hearing was posted and made available to the parties and the public. Today we will be the appeal panel for the appeal filed by Great Basin Resource Watch. This appeal is in response to a November 6, 2018 decision by the Nevada Division of Environmental Protection to issue a Water Pollution Control Permit to Eureka Moly, LLC for its Mount Hope project. Specific complaints in the request for an appeal hearing include NDEP's determination that there is no degradation to waters of the state is an error, NDEP cannot ensure closure due to an inadequate mine plan, and there has been no exemption to Eureka Moly, LLC, and that NDEP arbitrarily determined that the pit lake will cause no harm.

The SEC's role today is to affirm, modify, or reverse NDEP's decision to issue a Water Pollution Control Permit to Eureka Moly for its Mount Hope project. The SEC will consider the evidence and testimony heard today to determine if NDEP applied all pertinent laws and did not exceed its authority in doing so. All evidence and testimony provided must directly relate to NDEP's permit process, or the permit itself because those are the only evidentiary facts that the SEC will use to support its finding.

And I'm going to -- I'm want to read that sentence again, and especially for the parties. All evidence and testimony provided must directly relate to NDEP's permit process, or the permit itself because that's really all we're going to want to hear and we're going to make determinations based on.

With that background, I'd like to advise everyone here today that this proceeding is an appeal hearing regarding a contested case conducted pursuant to NRS Chapter 233B. This hearing is a quasi-judicial proceeding and we will ask everybody, including the members of the public, to conduct themselves respectively as if they were in court. At this conjuncture, I'd like to now have the parties introduce themselves. With the Appellant, please?

CAVANAUGHBILL: Julie Cavanaugh-Bill, here with Executive Director of Great Basin Resource Watch, John Hadder.

GANS: Thank you.

NUBEL: Dan Nubel, Deputy Attorney General for the State of Nevada, here on behalf of NDEP. And with me is Katie Armstrong, also a Deputy Attorney

General, and Frederick Perdomo who is Deputy Administrator at NDEP.

GANS: Thank you. Okay. Now what I'd like to do, again, is I just want to go through the steps we're going to follow today so everybody is on board. So again, bear with me as I explain this and then we'll actually get started.

Item 1 is we're going to call to order and establish that we have a three-member panel.

Number 2, we're going to have a public comment which is restricted, and I'll tell you why. I'll read that when I do that.

Then we're going to have opening statements and we'll begin with the Appellant, followed by the State. By the way, you can waive these opening statements if you desire.

Then we'll get into the actual presentation of the case. We want the Appellant to go first. The State may cross-examine the Appellant's witnesses, followed by redirect examination by the Appellant. I want to give everybody the opportunity to say what they need to say. I want the record to be really clear.

After the Appellant concludes its presentation of evidence, it will rest its case. The same case presentation process will be followed by the State. Now we will, after cross and if there is -- and I'll allow redirect and recross. But we go -- we're going to have our chance also. We're going to want to talk to you and the witnesses about any concerns or questions we may have.

Number 5 would be rebuttals. If requested, each party may present rebuttal evidence to issues presented in today's appeal and/or respond to testimony provided by the witnesses.

After completion of the rebuttal, or if rebuttals are waived, the appeal panel members may ask final questions of the witnesses who have already testified. Now this is important. Therefore, the witnesses need to remain available here even though you have already testified.

Following these final questions from the panel, no further testimony will be taken and we will move to closing arguments. And again, the same procedure. The Appellant will provide its closing argument, and then the State will provide its closing argument.

Okay. And then finally number 7, it gets to us. The members of this panel will openly discuss the matters of the appeal as necessary, and after such deliberation, I will entertain motions from members of the panel, and we'll call for votes on such motions. Please note that a simple majority of vote prevails in all matters considered by the Commission.

After the panel concludes its deliberation and issues its decision, the case will be concluded. A formal written decision will be prepared and distributed to all parties within 90 days. And then, by the way, an item number 8, there is a final public comment before we conclude our total process.

So are we okay with all this? Is there any surprises or questions, or any -- we're okay? Everybody agrees we're going to go this direction?

Fantastic.

I have a couple other comments that I want to make before we actually get in and get rolling. I said before you got a really good panel here, and I'm not trying to pat myself on the back. I know these two people next to me. They are really good people.

I also know that in the past, we've already been together twice before, and it really makes me feel good that we don't have a lot of contested personalities or a lot of back and forth arguments. And I think that's really good. I think that is going to be very important.

We understand that this is probably one of the most important hearings we've had in a long time; not that they're not all important. But you both -- both parties have brought out a lot of points that we have to consider, and you're making our job really tough today. So we take it seriously and we want to hear everything you have to say. But I really ask you, please don't reiterate. Please don't repeat things. Give us some credit for listening, and listening and hearing you the first time.

If we need to go two days, that's fine with me, okay? If we can finish it today, that's fine with me. But I don't want to go two days because we're re-discussing the same issues over and over, please. So I'd ask you that consideration for us, if not your opposing party also, please.

Okay. So with that, we're going to call the appeal hearing to order. And Val, I need you to verify that we have a three-member panel.

KING: Yes, Mr. Chairman. We have a three-member panel.

GANS: Okay. Any questions on that? Okay. You have three valid panel members that you couldn't ask for better people to be in front of you.

I will now go to the public comment. We begin the appeal hearing today with public comment. However, if a member of the public wants to speak about the activities associated with Eureka Moly, LLC in general, or this case specifically, you will have to hold your comments until after the panel has finished its deliberations and announced its decision. A little different than our other meetings we have. This is an appeal hearing. It's different, so I want to make that clear. We want to hear from you, but not before we're done. We don't want any adverse influence whatsoever, or positive influence for that matter, in what we're doing today until it's over. And then we'll like to hear you.

So with that in mind, is any member of the public here today that would like to speak, understanding what I just said? Okay. Please come forward.

LANDRETH: You can sit over here, ma'am.

KING: Oh, I don't think (indiscernible).

JUETTEN: Is this on?

GANS: Sure is.

JUETTEN: Okay. Commission --

GANS: I need your name, address, who you are, and that kind of thing first.

JUETTEN: Susan Juetten, J-U-E-T-T-E-N, 4420 South Jumbo Way, Washoe Valley, Nevada. And I should say that I have worked, in the past, for Great Basin Resource Watch but these opinions are sole -- mine that I'm about to say which --

GANS: Now, I want to make sure you understand what I just said about --

JUETTEN: It's nothing to do with this case that you are hearing.

GANS: Okay.

JUETTEN: Okay. I'd like to speak about the community's right to know. Citizens and communities with new mining projects are often unaware of the range in time length that consequences of the mine will have on their community. And you could argue that the public has a change to hear through the NEPA process, to read documents, and to attend a hearing; often one hearing in one community. But these are very technical issues often. And most of these meetings do not engage much of the public. And I don't believe there has been much study of the range and reach of NEPA process on the public but I think that's an interesting question I can't address.

But if the community knew that perpetual pollution was a real possibility, for instance, would they still want to host the mine? Would they decide if 30 years' worth of jobs were worth it, for instance, in the case of acid mine drainage, or perpetual pollution in general, or dewatering of springs and streams.

GANS: Potential pollution.

JUETTEN: Potential.

GANS: I want to make sure.

JUETTEN: Perhaps there would be, if people knew, more requirements made of the mining company that the community would like to have in place if they knew the full consequences. As we know, mining operations can have a large zone of influence well past the disturbed area to air and water. Mines in Nevada may consumptively use most of the water they pump in a region already over allocated. That's unarguable.

And further, out in the landscape dewatering can affect, for instance, pinion pines which native people depend upon for pine nuts and species depend upon. A large mine might affect multiple watersheds.

I am concerned that the Department of Interior's directions towards the agencies that manage our public lands like the BLM and the Forest Service are moving in exactly the wrong directly to address these issues. In -- for instance, there is a proposal now -- a ruling being considered for the Forest Service that will -- including for mines -- shorten the time period and make other restrictions on the public's and nonprofits' engagement in the process. And so there'll be less public knowledge as a result of this in the long term.

I wanted to use the Robinson Mine as an example in White Pine County. It's been there for 100 years. The community and county depend heavily upon mining, although the research shows that only nine percent of jobs are mining related. But dewatering, nevertheless, has affected water resources in the area, including the Murray Springs Bottle Company which was in Ely, and had to close because of the impact of the mine on their water. At that time, the company bottled about one million gallons of some of the best water, according to the USDA, in the United States. The spring no longer flows freely and the Robinson Mine has had to pay to drill several hundred feet to pump water to supply the town of Ely with water.

There are people there who live near the expanding waste rock dump and one has had to drill a new well. And it said in the EA that there are no minority populations or -- and one person that was spoken to public -- spoke publicly, drives to Ely for water now. And in the EA, it said there are no minority populations or low income populations identified within the plan boundary or the surrounding communities, including Ruth and Ely. But I doubt, having gone through this, that people have the money to drill wells on their own when the mining company has not offered to pay for them, which apparently was the case in this one case.

So overall, I am concerned that the well-known phrase, this land is your land, this land is my land, is becoming less and less true.

And I -- with the federal government stepping back, I had the thought that there could be more common sense education done for the public at the state level than we have now so they understand the consequences of these mines.

GANS: I would like to just comment to you. You're right on the edge with your comments, first of all. But I think that one of the things we want the public to understand from a State Environmental Commission position is that we -- this Commission itself, not to mention the State, has (sic) a lot of rules, regulations, and laws that we have to work within.

JUETTEN: Right.

GANS: So we're in a box, okay; this Commission. We have to be careful. We're not all-powerful. We just can't say whatever we want to say. The State is also governed by these -- and I'm not saying they're right or wrong, okay? I'm not taking you on on that. But I just want a realization here that we all have to work within these laws, rules, and regulations. And sometimes that puts us in a position where what I might like or not like doesn't matter because I'm working within those confines. And I want you to know that. And --

JUETTEN: I understand.

GANS: And so I'm not saying you're wrong.

JUETTEN: No.
GANS: I'm just saying be aware of that also.
JUETTEN: Thank you. I do. And I just would add further that laws can be changed.
GANS: Yeah.
JUETTEN: And if we don't talk about it in public forums like this, there's no impetus from the public, and our assembly people, and senators to change things. So.
GANS: Yeah.
JUETTEN: Thank you.
GANS: Thank you for your comments.
JUETTEN: You're welcome.
GANS: Is there anyone else from the public that wishes to be heard?
Okay. Seeing none, we will continue to the main body of our hearing which now means the onus is on the Appellant for an opening statement to begin.
CAVANAUGHBILL: Thank you. Would you like me to stand or sit?
GANS: No, you don't have to stand.
CAVANAUGHBILL: Okay. Thank you. And with all due respect, because I know the Commissioners here have heard a lot of information. We've spent hours here in the last two hearings, so I will try to be very brief. Just to reiterate, Great Basin Resource Watch today, through our witness' testimony and evidence, will demonstrate that this permit needs

to be reversed, that there will be degradation of state waters. The legislative policies both are NRS 445A.305 and NRS 534.020 -- state the policy of the legislature which is to maintain the quality of the waters of the State of Nevada, and also to prevent the waste of underground waters.

Here in this project, we are seeing drinking water going into this pit lake which will then change it into a no beneficial use. That's problematic for the entire community, the environment out there. The EPA itself made a finding that the proposed project would consume up to 11,300 acre feet per year of groundwater, and that if there wasn't a long term plan in place which we do not believe the plan that's in place now is adequate -- we believe there's technical errors, both in the characterization of the waste rock, the incorrect assumptions regarding the management of that waste rock, in particular, the potential asset generating rock, the faulty pit lake water analysis, and a failure to recognize the perpetual state of the contamination and degradation that would be going on at this site.

We believe that the agency has failed to demonstrate that there'll be no long term negative effects to the environment and to the ground waters, and that this Commission has the authority under NRS 445A.520 to establish water quality standards at a level designed to protect and ensure continuation of the designated beneficial use or uses which the Commission has determined to be applicable to each stream segment or other body of surface water in the state. So the agency wants to say once the groundwater hits the pit lake, it turns into surface water and then there's no degradation of state waters. But we read the statutes and the law to say that this Commission can set those standards.

We have concerns that the interpretation now on not designating a beneficial use to the pit lake is somehow eliminating that water quality standard so we want this Commission to reverse the permit, look at these issues, and have the state agency either reanalyze using correct technical data, correct assumptions, or have an independent third party review of this to get some expert opinion, especially in light of the EPA's concerns with respect to the water as well. Thank you.

GANS: Okay.

NUBEL: So before I get started on my opening, I want to let you all know that I do respect your time as well, and that it's been very pleasant working with Ms. Cavanaugh-Bill on this case. We have agreed to stipulate to all of the exhibits prior so that we don't have to introduce them individually with the witnesses. And I think that's going to save us a lot of time.

GANS: Ms. Cavanaugh, do you agree -- are you okay with that?

CAVANAUGHBILL: We do, Your Honor.

GANS: Okay.

CAVANAUGHBILL: That's supposed to be (indiscernible).

NUBEL: So this appeal revolves around a permit the NDEP issued to Eureka Moly for a mine near Eureka, Nevada. The permit was first issued in 2012 but construction has yet to begin. The project has yet to secure funding and no estimated date currently exists to begin mining.

During both the initial and current permit cycle, Great Basin Resource Watch publicly commented regarding their concerns with the mine. NDEP takes public comments seriously and incorporated several changes to the permit to meet Great Basin Resource Watch's comments and concerns. Despite NDEP's changes to the permit, Great Basin Resource Watch filed this underlying appeal related to the expected Mount Hope pit lake.

Although the briefs cite to a variety of statutes and regulations, the core of this case revolves around compliance with the Nevada

Administrative Code 445A.424 and 429. Subsection 1 of 424 requires that a mining facility cannot degrade groundwater below existing background levels. Based on all of the credible evidence provided to NDEP, the permit complies with this term. The permit requires Eureka Moly to remove all waste rock from the site and dispose of it in separate facilities. These disposal facilities are then engineered to ensure that no contaminants reach the groundwater below. These protections include double-lined synthetic liners with high density polyethylene, reinforced concrete floors, and storm water drains.

While Great Basin Resource Watch noted some concerns with the waste rock disposal facilities, most of its concerns relate to the water quality of the future expected pit lake. A pit lake is a body of water that results from a mine pit going below the groundwater table. NEC 445A.429 is the applicable regulation for pit lake compliance. That regulation states that a pit lake must not, (1) degrade the ground waters of the state, or (2) affect adversely the health of human or animal life.

NDEP has reviewed and evaluated many studies and evaluated as substantial amount of data regarding the expected water quality of the future Mount Hope pit lake. This case provides a mere snapshot of the vast quantity of data that has been gathered around the Mount Hope site. These studies and data show that the pit lake will not violate the standards set forth in NEC 445A.429.

NDEP's first witness, Matthew Schulenberg, is an engineer with NDEP. He will discuss NDEP's review of Eureka Moly's permit application and all applicable studies. He will discuss the waste rock characterization report and the steps that the permit requires Eureka Moly to take to contain waste rock.

Mr. Schulenberg will discuss the locations where waste rock will be stored and the protections that are in place to ensure that the environment cannot be contaminated.

Mr. Schulenberg will discuss the pit lake reports, and the study that shows that the pit lake presents the lowest achievable scientific risk to animal life. Lastly, Mr. Schulenberg will discuss the various schedule of compliance items, and continuing investigation items that will require Eureka Moly to continuously update its studies as mining commences and continues.

Our next witness will be Dr. Christine Olson, an environmental scientist with NDEP who specializes in pit lake hydrology. Dr. Olson will guide us through the 2010 hydrogeology model. She will discuss the inputs and outputs that the model considered.

She will then discuss the model's conclusion that the pit lake will be a terminal sink. A terminal sink means that all the water within the pit lake can only escape through evaporation. This means that the water in the pit lake does not have the potential to mix with the groundwater outside of the pit lake.

Next, NDEP will present testimony from Brent Johnson. Mr. Johnson is a highly experienced scientist who developed the 2010 pit lake geochemistry model for the site. Mr. Johnson will discuss the results of the geochemistry report. Mr. Johnson will also address the concerns that Great Basin Resource Watch has articulated in its briefs and in its comment letter.

Lastly, NDEP will present testimony from Todd Process. He is a supervisor at the reclamation branch of NDEP's Bureau of Mining and Reclamation. Mr. Process will discuss the bonding that will be in place to ensure full protection of the state's environment.

Before getting into testimony, it's important to consider the standard by which Great Basin Resource Watch must prove its case. The subsections upon which Great Basin Resource Watch bases its appeal require it to prove that the final decision was, (1) affected by an error of law, (2) the final decision was clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record, or (3) the final decision was arbitrary or capricious, or characterized by an abuse of discretion. These are high standards of proof.

The Nevada Supreme Court has said, in Nevada Public Employees Retirement Board v. Smith, that an administrative agency charged with the duty of administering an act is impliedly clothed with the power to construe the relevant laws and set necessary precedent to administrative action. And the construction placed on a statute by the agency charged with the duty of administering it is entitled to deference. As stated in Great Basin Resource Watch's opening brief, the decision of an administrative agency will generally not be reversed unless it is arbitrary or capricious. Their brief went on to state that a decision is arbitrary or capricious if it is baseless or despotic, or a sudden turn of mind without an apparent motive.

In order for Great Basin Resource Watch to show an error of law, it must demonstrate that NDEP's decision did not comply with substantial evidence. As stated again by the Nevada Supreme

Court, substantial evidence exists if a reasonable person could find that the evidence is adequate to support the agency's conclusion. Great Basin Resource Watch will not be able to show that NDEP's decision was not supported by substantial evidence.

NDEP evaluated a truly prolific amount of studies and data in reaching its decision. The data shows that the Mount Hope project will not result in harm to the environment. Since the project meets all applicable statutes and regulations, NDEP is required by law to issue the permit. NDEP, in turn, crafted a permit that required additional characterization and bonding to ensure that the environment is protected now and into the future.

Great Basin Resource Watch's briefs raise an issue related to NDEP's interpretation of the term potential in NAC 445A.429. Under Nevada law, an agency's interpretation of its governing statutes and regulations is entitled to deference. To quote Meinhard v. State, "When we speak of a potential we don't mean a certainly or even a likelihood; but we also don't mean rank, wild speculation. The possibility must be a meaningful one." As you will hear today, NDEP's interpretation of the term potential involves looking at scientifically established risk standards established by the BLM and the EPA, and then identifying whether a measurable risk exists in each individual case.

Ultimately, NDEP will show that the permit complies with NAC 445A.424 and 429, as well as all other applicable statutes and regulations. The mine and the mining facilities will not result in degradation to the ground waters of the state. The health of human and animal life will not be adversely affected. Given that this permit complies with all applicable regulations, NDEP requests that the Commission uphold NDEP's decision to issue the Eureka Moly Water Pollution Control Permit for the Mount Hope site.

GANS: Thank you. Okay. We're ready to proceed with the Appellant's case.

CAVANAUGHBILL: Okay. I'll call John Hadder.

KING: Do you want to swear in all the witnesses at one time?

GANS: I would like to --

KING: Or do you want to do them (indiscernible)?

CAVANAUGHBILL: Should we get the --

GANS: Are all the witnesses here present?

CAVANAUGHBILL: Ours are, Your Honor.

GANS: Oh, yours are?

NUBEL: Yes.

GANS: Can we just go ahead? Is it okay with the parties that -- if she swears --

CAVANAUGHBILL: Swear them all in?
GANS: -- everybody in at once?
GANS: Sure.
CAVANAUGHBILL: Sure.
KING: Yeah? Okay. So will everyone who's giving testimony today as a witness please stand and raise your right hand? I'll swear everybody in together.
CAVANAUGHBILL: She's going to swear you all together.
KING: Okay. Do you and each of you solemnly swear to -- or I'm sorry, solemnly swear or affirm to tell the truth, the whole truth, and nothing but the truth in the testimony you give during these proceedings?
IN UNISON: Yes, I do.
KING: Thank you.
(Witnesses sworn)
GANS: Did I hear a yes from you?
UNIDENTIFIED: Yes, I do.
NUBEL: Before we get started, we have the exhibit binders as well if you would like those to be passed out.
CAVANAUGHBILL: You have ours as well?
KING: You can take them both because they stipulated as to all of them. Okay.
NUBEL: It's a lot.
GANS: We know.
NUBEL: We couldn't put the exhibits into one binder so

we have 1 and 2 --
CAVANAUGHBILL: So it's that one for the witness.
NUBEL: -- to denote (indiscernible) which is which.
KING: This is for the witness?
GANS: Say it again?
NUBEL: 1 and 2 for the exhibit binders.
GANS: Okay.
NUBEL: To separate them.
GANS: Okay.
CAVANAUGHBILL: And just to note --
GANS: And both parties have --
CAVANAUGHBILL: -- for the Commission, our Exhibit H --
GANS: -- each other's exhibits?
CAVANAUGHBILL: -- is in the front.
KING: Here you go (indiscernible).
UNIDENTIFIED: Oh. Thank you so much.
KING: So you have both 1 and 2.
UNIDENTIFIED: Yeah, got it.
CAVANAUGHBILL: In the blue -- in the Appellant's exhibits, Exhibit H didn't make it into the binder --
KING: Oh, you're bringing it --
CAVANAUGHBILL: -- so it's separate.
NUBEL: Okay.
GANS: H.
CAVANAUGHBILL: (Indiscernible) that extra one.
GANS: Oh, it's the last one.
CAVANAUGHBILL: I think that's an extra one though because you brought me two new ones.

NUBEL: Okay.
CAVANAUGHBILL: But I only need the 28 ones.
NUBEL: Okay. Is it the full one?
CAVANAUGHBILL: It's the 28 one. I need that. I don't need that.
NUBEL: Want this one? It's a brand new one.
CAVANAUGHBILL: I don't need it. I got them all in here.
NUBEL: Okay, all right.
CAVANAUGHBILL: So she had the second one.
GANS: The floor is yours.
CAVANAUGHBILL: All right. I will call John Hadder. You can sit right there. Good morning. Could you please state and spell your name -- first and last name for the record?
HADDER: Yes. John Hadder, J-O-H-N H-A-D-D-E-R, and I'm Executive Director of Great Basin Resource Watch.
NUBEL: Excuse me? Could I just ask Mr. Hadder to identify the -- did he bring notes to the stand?
GANS: Oh.
HADDER: Yeah.
CAVANAUGHBILL: Oh, I didn't see that, sorry.
NUBEL: I just wanted to know what he has.
HADDER: Is it a problem? Yeah.
NUBEL: Yeah.
CAVANAUGHBILL: Can we turn that blind, too?
KING: I'll get it, Julie.
CAVANAUGHBILL: Okay.
HADDER: This is to remind me of the numbers, but I mean

it's just stuff that's in here. I don't -- if you don't --

NUBEL: (Indiscernible).

CAVANAUGHBILL: You want to just turn it over?

KING: (Indiscernible) exhibits.

HADDER: Take a look at it.

CAVANAUGHBILL: Well, we'll use the exhibits.

HADDER: Okay. That's fine. Yeah. I just had it in my hand.

NUBEL: It's okay.

CAVANAUGHBILL: Much better, thank you. Okay. So Mr. Hadder, you said you're the Executive Director of Great Basin Resource Watch?

HADDER: I'm sorry. I didn't hear that.

CAVANAUGHBILL: How long have you held that position of Executive Director of Great Basin Resource Watch?

HADDER: I've been Executive Director since 2009.

CAVANAUGHBILL: Okay. And what specifically are your responsibilities in that position?

HADDER: Pretty much everything. No, I -- I have to fundraise for the organization, manage our programs around examination of mining projects, working with -- working with other staff, contract -- and contracting with any consultants we might have for -- for review of mine projects. And we also -- I also travel to the communities where the mines occur. We go on mine tours. We -- I meet with the state agency on -- on multiple issues. So it's a number of those kind of responsibilities that -- to get a sense of what's happening in the Great Basin in terms of mining, whether it's some of the concerns that communities might have, are there any reforms that we think should be advanced or discussed.

We also do occasionally work in the legislature. I also do some of that to get reformed.

CAVANAUGHBILL: And what is Great Basin Resource Watch's mission statement?

HADDER: Our mission -- yeah, our mission is to -- is to work with communities to protect their air, land, and water from the negative impacts of mining.

CAVANAUGHBILL: Okay. And what is your specific training in doing this work? You said you examine mine projects?

HADDER: My background is in chemistry and I have a -- I have a master's in physical chemistry. I -- and since 2006 is when I first started. So mostly my specific experience with -- with mining projects has been on the job training. But with my background in chemistry, I feel like I am able to review the documents, understand what they're after, and what I don't -- and then when we do need expert analysis, seek those people that have that specialized background and experience.

CAVANAUGHBILL: And how long have you been engaged in this line of work?

HADDER: Since 2006.

CAVANAUGHBILL: Okay. And has the organization done anything so that you have that expertise on board when you're reviewing projects? In terms of the structure of the board, or otherwise?

HADDER: Well, yes. We do have -- on our board we have Glenn Miller who has been -- he can tell you. He's been working on mining issues for many, many years, probably 30 years plus. He has a lot of experience. Recently, Houston Kempton joined our staff and he's -- he was one of our witnesses also. He has 25 years of experience specializing in geochemistry water quality assessments, pit lake analysis, all that kind of stuff. And so that had a lot to do with why we're here today actually.

CAVANAUGHBILL: Okay. And why we're here today with regard to the Mount Hope Water Pollution Control Permit, Great Basin Resource Watch actually submitted comment, both in 2012 and then again in 2018, correct?

HADDER: That's correct.

CAVANAUGHBILL: Okay. After the permit was issued in 2012, Great Basin Resource Watch did not appeal?

HADDER: That's correct.

CAVANAUGHBILL: So what was the change here? Why the appeal currently and not in 2012?

HADDER: Yes. When we first -- when we first looked at the mine plan, we definitely had concerns. The experience that -- my experience indicated to me that this could be a -- could be a long term problem. Out there, we're concerned about a number of things. We did have a hydrologist review the -- the monitoring so we wanted to make sure that the monitoring was in place to -- to be able to capture any -- any toxic drainage, and make sure that it could be arrested.

At that time, we had concerns. We raised some of these concerns, more in the environmental impact statement at the time, but it wasn't until -- it wasn't until we started working with Houston that we got expert opinion. While I have a lot of experience, I think I can recognize the markers when I see them at a site, like, okay. It looks like we need to look into this a little more deeply. It wasn't until Houston, with his specialized knowledge, was able to examine it. So I asked him, like at work, can you take a look at this -- this analysis? Can you take a look at this? Do you feel like there are long term concerns?

And he affirmed that there were. And so that's why we decided to pursue it more aggressively in this renewal round.

CAVANAUGHBILL: And when did Mr. Kempton make this analysis?

HADDER: About four years ago now.
CAVANAUGHBILL: Were these raised in the comment letter that Great Basin Resource Watch submitted?
HADDER: Yes.
CAVANAUGHBILL: Okay. And if you could turn to Exhibit C --
HADDER: The -- the --
CAVANAUGHBILL: Oh.
HADDER: The second comment letter.
CAVANAUGHBILL: The 2018?
HADDER: The renewal, right.
CAVANAUGHBILL: Okay.
HADDER: Right.
CAVANAUGHBILL: If you could turn to Exhibit C?
UNIDENTIFIED: Do you have an extra?
NUBEL: Okay.
CAVANAUGHBILL: I thought I gave (indiscernible) the last time.
NUBEL: Thank you.
HADDER: You said A?
CAVANAUGHBILL: C.
GANS: C.
HADDER: C?
CAVANAUGHBILL: Yeah. Sorry I thought I gave it to you at the last hearing.
UNIDENTIFIED: (Indiscernible).
CAVANAUGHBILL: Yeah. Do you see that document?
HADDER: Yes.
CAVANAUGHBILL: Okay. The exhibits have all been stipulated to admissibility so I won't go through the whole

laying the foundation with you. But this is the comment letter that you submitted, correct?

HADDER: Correct, yes.

CAVANAUGHBILL: And can you point out the different concerns that were set forth and raised to the agency during the permit process? And if we could just summarize the key ones that are at issue in this appeal.

HADDER: Right. We did raise some concerns around the monitoring plan. Although there have been quite a few adjustments to that, we still had a few -- a few concerns.

CAVANAUGHBILL: The agency made adjustments based on your comments?

HADDER: Yes.

CAVANAUGHBILL: Okay.

HADDER: They did. Yes, they did. We did have -- I did have -- we had did (sic) concerns around -- regarding the geochemical characterization that -- that -- what -- that the -- the sampling was insufficient in the right areas. For example, around the pit lake -- the pit -- the pit wall, there wasn't -- was a sort of minimum amount of -- of data. And that's actually in the environmental impact statement, stated as well. And the agency agreed to do an update later on after the mining started.

But the geochemical characterization -- so we were concerned that there might be more acid generating material than is in -- is currently planned for. And that -- so that would be something that you'd want to -- you'd want to organize your mine plan at the beginning to understand the full extent of possible acid mining draining material. So we felt maybe -- I thought that there wasn't enough data to really clarify the (indiscernible) so bottom line is a lot of uncertainty around -- definitely was a lot of uncertainty around that and that more data needed to be gathered.

We also -- we were also concerned about, again, this -- this problem of long term pollution at the mine site, that the -- the waste rock -- the waste rock dumps result in seepage into the groundwater -- eventual seepage into the groundwater which would degrade the waters of the state, and that the mine plan was not adequate to capture or -- or is -- or treat water in perpetuity; a hundreds of years kind of problem. That was long term.

We were also concerned that the analysis of the pit lake was inaccurate. It -- it seemed from my experience initially that pit lake looks pretty good by their analysis and other molybdenum mines that we were aware of usually have water quality problems. So this was another one that Houston took a look at in detail. And that -- so that's another one we feel like the analysis is incorrect. It has key errors in it. And we cited that.

We feel -- so those are -- those are the -- those are the key -- key issues we raised in the comments letter.

CAVANAUGHBILL: And those were all raised during the permitting process?

HADDER: Yes.

CAVANAUGHBILL: Okay. And did you have the opportunity to actually talk with personnel from the agency to try to address some of these concerns as well?

HADDER: Yes, we did.

CAVANAUGHBILL: Okay. And -- but no resolution was found?

HADDER: Well here we are. But we did -- I think we did talk through, and we have done this in the past. I think that Great Basin Resource Watch strives to avoid this process. And I think that there were additions to the -- to the permit which are -- which were welcome. They did agree with some of our analysis. I could talk about to what extent.

They didn't -- but it remained a problem because we wanted to see the errors corrected before the mine started. What we saw in -- what we saw was well, we'll redo -- well, there'll be new analysis done, but that's only after the mine starts and then there was a clause that once -- once the mine hits the water table then there'll be a new pit lake analysis and these sorts of things, which -- which I think that we understand the iterative process of the permitting. It's a common process. So we expect that that anyway.

We just wanted to see -- we just wanted to make sure with a mine project that hasn't started yet that's going to be a very large project, that's going to have a significant effect on the local community, that everything is as good as it can get before it starts, that the mine plan going in is with the -- with -- with the best possible knowledge, the best possible data, and the best possible understanding. That was kind of the -- that's why we are continuing just because we felt like the -- the changes -- the schedule compliance changes were, again, after the mining would begin operations. And it would start on a mine plan that we felt was not adequate.

CAVANAUGHBILL: And how many permits -- Water Pollution Control Permits have you reviewed in your time as Executive Director?

HADDER: Oh boy. Probably -- let's see -- usually --

CAVANAUGHBILL: We are talking dozens?

HADDER: Yes, easily -- I have -- I haven't counted that number. Yeah, dozens, 30, 40.

CAVANAUGHBILL: Okay. So what makes this permit -- what makes this project -- you said this is a very large project. It's going to have significant impact on the community. What makes this Mount Hope project of such great concern to your organization?

HADDER: Well, it hasn't started yet. That's one of the big things. That's one of the reasons why we -- we put a lot of effort into it because before you -- once -- once the mine -- once a mine starts, there's a certain thing -- there are certain aspects of the mine plan that are irreversible, you can't, kind of, go back on. And it's like -- it's like anything else.

You -- and I -- and I think that mining companies are very well organized in their process. They want to make sure that they have -- they know exactly what they're doing, and that it's going to be profitable when they go forward. So they want to have a clear picture. They don't want to have to change it midstream. And if they do, sometimes it -- it's not -- it's -- could be unprofitable for them.

So since it has -- since it's a project that hasn't started yet, that's one of the key aspects. And we have been concerned about the wasting of Nevada's water and pit lakes for some time. And this would be another project that would have a large pit lake and their water would have no use, no beneficial use established to it. So that's an issue that's been ongoing with us.

And so before the mine starts, there should be -- the mine plan should try to address some of these -- these issues. Mines that are already out there that have already started, it's kind of -- it's difficult to do a reversal on those. The other thing is that we've been in contact with the community a lot as well. And the community is quite concerned. There are some people that support the mine, but there are a lot of people that don't.

It's a community that contains a lot of agriculture. Water use is obviously a critical factor for them. We don't think that a lot of the people in the community are aware that this mine has the potential to have hundreds of years of water pollution that would have to be actively managed. And so I think that there is a transparency problem as well. But that was another reason, because of concern in the community was -- was strong and brought us forward to really put a lot of effort into this project.

CAVANAUGHBILL: Okay. And when you're talking about large, how large is the project proposed to be?

HADDER: Well, it's about 1.7 billion tons of waste rock material. And I'm not sure exactly how much ore material, but it's probably -- probably another half a billion tons of that. This is one of the largest -- this would be one of the largest mines in Nevada.

Cover the whole area around Mount Hope with waste rock. Waste rock piles will affect three hydrographic basins. There's agriculture in -- in Diamond Valley, Kobeh Valley, and Pine Valley; all of those spaces. So it's a lot -- there's a fairly significant footprint. Just to the northwest is Roberts Mountain which is a wilderness study area as well.

So and I -- I've been taken to some of the backcountry by people that live there, and it's striking country as well. So that's another thing that they are concerned about in how -- what's going to happen to that area around -- around there. So it's -- it will be one of the largest if -- in Nevada; not the largest, but up there.

CAVANAUGHBILL: Okay. And in your comment letter in Exhibit C, you state a couple of times that you believe that the permit would violate Nevada State law?

HADDER: Right.

CAVANAUGHBILL: What did you base that understanding on?

HADDER: Well if the -- our concern is that if there's drainage from the waste rock dumps into -- into the groundwater, if it's not captured and treated, then that would degrade groundwater. So that would be a degradation of waters of the state. We also feel, in general, that water degradation of the state -- waters of the state is going to happen anyway just from the pit lake issue which is a complicated process.

But in our view, the ground waters -- the groundwater that will flow into the pit lake is waters of the state. The water that's in the pit lake is waters of the state. And the nature -- the quality of the water in the surrounding groundwater is definitely of lower -- higher quality than in the pit lake.

And furthermore, the beneficial uses available to the groundwater that would flow into the pit lake are lost when they go into the -- in the mining pit lake. So we feel like that's --

NUBEL: Excuse me? I'd like to just object to the testimony that you just heard, and just note that Mr. Hadder is not a lawyer, and he is interpreting the legal provisions of Nevada State law.

CAVANAUGHBILL: And I was just asking where he came to the opinion that it was a violation of state law because he did author this letter.

NUBEL: Which calls for a legal conclusion as to what degradation of waters of the state is.

CAVANAUGHBILL: And I think he's just basing it on his lay opinion and background.
GANS: The objection is sustained. So please don't go that direction.
HADDER: Okay.
CAVANAUGHBILL: So let me just change that then. What is the -- how is the agency interpreting -- you said they're interpreting the groundwater flowing into a pit lake, when it hits the pit lake it because surface water according to the agency?
HADDER: Correct.
CAVANAUGHBILL: And what is your understanding of the impact of that in terms of determining water quality pursuant to the regulations that you've worked with?
HADDER: It was stated that 445A.429 is the water quality standards applied to the pit lakes. Although that standard does require that there's a beneficial use as I recall --
CAVANAUGHBILL: Okay.
HADDER: If you look in the legislative (indiscernible) --
NUBEL: I need to object to this as well that he's interpreting the law. And that's really the position of counsel to do in their statements. He's not a lawyer. He doesn't have any legally trained expertise.
GANS: Okay. I agree.
CAVANAUGHBILL: And again, I'm just asking for his -- based on

his experience because he's worked with these regulations and that was -- he was the author of this letter so I just wanted to know where he -- his --

GANS: Okay, I'll -- I'm going to let him proceed, please.

CAVANAUGHBILL: Thank you.

HADDER: So the -- the NRAs to the NRS that was stated in the -- in the reply brief and the -- NRS 445.520 talks about water quality standards. And the 420 -- the NAC 429 standard is -- it was derived based on that -- based on that statute. But that statute does indicate that it should apply to any water that has a beneficial use. So since there's no beneficial use, it's not clear to us if that standard can really apply.

CAVANAUGHBILL: Okay. And you guys also raised concerns in your comment letter about perpetual pollution and you've mentioned -- you've touched on it a couple of times in your testimony. What are those concerns? Or if you want to deter to Mr. Miller or Mr. Kempton --

HADDER: No, I think that -- again, it's the -- out of the witnesses will -- will address those very specifically. But the problem -- there's a common problem in a lot of mine sites called acid mine drainage and it usually -- it results from having reactive -- reactive rock. Typically it has a high -- what they call high sulfide content. This reacts with air and the water catalyzed -- or catalyzed by bacteria, and starts a cycle of what they call acid mine drainage. Very difficult to stop, although it can sometimes. But it's -- in some cases, it's going on for a long time.

Nevada does have other sites that have this problem. The Rain Mine in Nevada is -- been draining acid for a long time, and that's a serious concern to all of us. The Phoenix Mine is also another site which is going to be a long term site. We do not want to see Mount Hope go in that direction. That's our concern also is that those mines are looking at having to treat acid drainage indefinitely.

And we're -- we're concerned that there is going to be someone to treat it. We're talking about hundreds of years now. Who is going to be around to treat that? Is -- we want to make sure there's sufficient bonding in place, that there's money available to treat it. But it's -- it's -- it's a difficult issue to deal with.

So that is one reason why put a lot of attention on this site because if we thought that this was a possibility, then it needs -- there needs to be a hard look at it. Make sure that the mine plan is adequate. Make sure that the community fully understands that's a -- this is a possibility and they still want to host this -- this kind of -- this kind of site.

So that's why we -- we believe that, you know, a third party expert that the state -- it would've been good to engage a third party independent technical analysis (sic) with some expertise in this area to be absolutely sure.

CAVANAUGHBILL: Okay. Thank you. I have nothing further at this time.

NUBEL: Oh. Sit down so you fit.

KING: You can stand up if you'd like to.

NUBEL: So let's go back to some of the legal conclusions that I heard you draw.

HADDER: Okay.

NUBEL: You stated, and correct me if I'm mischaracterizing, that you don't think that the NAC 445A.429 establishes a water quality standard because there's no beneficial use; is that correct?

HADDER: Well I think it's inconsistent with the NRS 520 which establishes -- which connects water quality standards to a beneficial use.

NUBEL: Okay. And does Great Basin Resource Watch run a website?

HADDER: Yes, we do.

NUBEL: And are you familiar with the contents of that website?

HADDER: You know, it's been a while since I looked at some of it.
NUBEL: Okay. So if I told you that on -- or I'm sorry -- it's March of this year, 2019, which is after this case started, that your website stated that although numerical, it does qualify under NRS 445A.420 as a descriptive water quality standard. And that was said in reference to NAC 445A.429.
HADDER: That's possible. I haven't looked at that for a while.
NUBEL: So your own website admitted that NAC 445A.429 is a descriptive water quality standard under the NRS?
HADDER: That's the State's position, correct. We're stating what the -- what the -- how it's -- how the State applies that standard. And what we're saying at this point is that on examination of that, that we don't agree with that. So --
NUBEL: Right. But I would be correct in saying that your website did not note that it was the State's position and instead just said, although numerical it does qualify under NRS as a descriptive water quality standard?
HADDER: Right.
NUBEL: Okay. So one of the things that you discussed in your comment letter was the amount of characterization; is that right?

HADDER: Um-hum. Yes, I did.
NUBEL: Okay.
HADDER: But here's -- I -- can I say something?
NUBEL: Sure, absolutely.
HADDER: And I -- I stipulate that I'm not an expert on characterization either, okay?
NUBEL: But you're --
HADDER: But I -- what I referenced were -- I referenced a number of citations, did some research on what would be a -- a characterization profile. And so that's the basis of thing, okay?
NUBEL: Okay. But you're familiar with the contents of the comment letter?
HADDER: Yes.
NUBEL: And the references cited therein?
HADDER: Yes.
NUBEL: Okay. So your comment letter claimed that Eureka Moly's characterization of the rock data did not collect enough samples; is that right?
HADDER: That sounds right.
NUBEL: And --
CAVANAUGHBILL: If counsel could just let us know the page?
NUBEL: Sure. So I'm looking at the comment letter on page 8.
CAVANAUGHBILL: Thank you.
NUBEL: And it's at the bottom there, the bare minimum for characterization, that section.

And it cited to an article -- an EPA

article, correct?
HADDER: Yes. Yes, EPA review.
NUBEL: And that article is the US Environmental Protection Agency Technical Document Acid Mine Drainage Prediction?
HADDER: Yes.
NUBEL: Okay. But that article cites to a number of opinions regarding the amount of samples, doesn't it?
HADDER: Yes, it does.
NUBEL: And one opinion it cites to states that 1 sample for each 1 million tons is sufficient, correct?
HADDER: Correct.
NUBEL: Didn't Eureka Moly's characterization achieve that?
HADDER: Just about. That was one opinion out of many. So there were -- that review article had several different opinions as to what -- and that was one of -- one of many.
NUBEL: Right.
HADDER: And we did state that in our comment letter that they were right on the edge of that standard.
NUBEL: Yes. And the EPA article also stated that there are reservations to prescribing a fixed number of samples for collection per volume of material, correct?
HADDER: I don't -- did we put that in our -- I don't -- is that in our -- I --

NUBEL: No. It's not in your comment letter.
HADDER: Yeah. It probably did --
NUBEL: It's in the article.
HADDER: -- say that, but I don't recall exactly that language specifically. But that sounds about right.
NUBEL: So the EPA article agreed that really there's no fixed number of samples that must be collected at a site?
HADDER: I would say my assessment of the EPA article was that there's a lot of uncertainty around the selection process.
NUBEL: Right. And how did the article suggest that you remedy that uncertainty?
HADDER: I don't recall exactly what was in the article about remedy. Certainly -- certainly the -- we went on to -- we went on to the other -- the other review that had suggested more sampling.
NUBEL: Well would I be correct if I stated that the article provided that due to general uncertainty regarding acid mine drainage prediction methods, it would be prudent to sample waste or material throughout the life of the mine?
HADDER: Oh, sure. Of course. You always get better information as time goes by. Correct.
NUBEL: And isn't that what Eureka Moly is doing under this permit?
HADDER: Yes, they are. But after they're starting the

mine.

NUBEL: Right. And doesn't that article state that it would be prudent to sample waste and materials throughout the life of the mine?

HADDER: Right.

NUBEL: So the article itself concludes that really the way to remedy this uncertainty about the amount of samples to collect is to continuously sample throughout mining?

HADDER: Right.

NUBEL: And didn't -- isn't Eureka Moly doing that?

HADDER: That's the proposal. But you can also eliminate the uncertainty by getting more data up front. And that's also advisable, not just by -- by other sources -- that's some of the other sources as well.

NUBEL: But as you stated, there is no general agreed upon opinion about the amount of samples to collect, right?

HADDER: Again, I'm not an expert on this. I consulted a number of sources. So the main source that we -- that we -- that we looked at was a (indiscernible) review, which had a sampling (indiscernible) tables and that's a lot of where I -- we draw a conclusion. That was also -- that same table was also used by a later report that NDEP cited in its analysis.

There is a lot of uncertainty, and we just thought that they needed to narrow it down a little bit by getting more data up front.

NUBEL: Okay. One of the other concerns you mentioned is that Eureka Moly and NDEP should have looked at other molybdenum mines, correct?

HADDER: Yes.

NUBEL: And part of your concern is based on the fact that you've observed degredaded water -- degraded water in other molybdenum mines?

HADDER: Yes.

NUBEL: But wouldn't you agree that the best evidence you can get is site specific?

HADDER: Oh, yes. It's site specific.

NUBEL: So just looking at other molybdenum mines would not necessarily give you the correct information you would need to determine a mine plan for this molybdenum mine?

HADDER: That's correct. It's -- it's the -- the -- I think the agency's approach has been that we have to look at each site individually. What we were looking at in this is saying, well, there's evidence out there that these kind of mines can be problematic. So we thought there should be an extra step given all the implications of the site to just make sure. But yes, there are site specific issues.

NUBEL: Okay. And you can correct me if I'm wrong on this. I thought it was interesting during your testimony that you said that there was not a hard look completed on the pit lake water quality; is that right?

HADDER: Well, maybe I should state that differently. I mean --

NUBEL: But did you say it?

HADDER: Is that what I said?

NUBEL: You said "a hard look." Somebody needs to do a hard look.

HADDER: Yeah. And we wanted -- what we wanted was an independent assessment by someone who's independent of the company that the agency that the public would trust. So that's kind of -- that's what I meant by -- an independent but an assessor that the State of Nevada would be -- would accept.

NUBEL: But wouldn't that really require a change in regulation and statute to accomplish?

HADDER: I don't know. I don't think so, but I don't know for sure. When we met with the state agency, they said that they didn't have the authority to do that. And I don't know if that's true.

NUBEL: Isn't the point today -- why we're here today to evaluate the law as it's written currently and to apply that law?

HADDER: I would assume so.

NUBEL: Now, the reason I brought up the hard look is because you're familiar with the EIS on this project, right?

HADDER: Yes.

NUBEL: And are you -- did you know that there was an appeal on the environmental impact statement to the Ninth Circuit?

HADDER: Right.

NUBEL: And that the Ninth Circuit verbatim, used the term "hard look", and found that a hard look was completed on the pit lake at issue here?

HADDER: Yes.

NUBEL: Okay. And the appeal was remanded to the District Court based on issues unrelated to the pit lake?

HADDER: Yes. That's correct.

NUBEL: Okay. That's all the questions that I have. Thank you.

GANS: Any redirect?

CAVANAUGHBILL: Mr. Hadder, with respect to the EIS appeal to the Ninth Circuit that was Great Basin Resource Watch that did that appeal as well?

HADDER: That's correct.

CAVANAUGHBILL: Okay. And did that appeal deal directly with the water pollution control permit as well?

HADDER: Well, it wasn't stated in our -- in our comments to the Ninth Circuit. In fact, that -- the analysis that's in our comments on this renewal of the pit lake and the perpetual treatment was not in the original appeal on the EIS, because we hadn't done that expert analysis yet. We had focused on other issues. We did raise some concerns about the pit lake and those issues. And we did -- we addressed them, but we did not have the same analysis that we have today.

CAVANAUGHBILL: So the Ninth Circuit did not have this analysis in front of them?

HADDER: That's correct.

CAVANAUGHBILL: And Mr. Nubel was asking some about the company. Isn't Eureka Moly already doing this in terms of its sampling going through the mine project? Has the mine project started?

HADDER: Not, no. To my knowledge it hasn't. It's not --

CAVANAUGHBILL: Do you know what stage in? I mean, are they ready?

HADDER: They have done -- they did -- there was some scraping done to the pit area, I think it was back in 2011, but that's all that's been done as far as enhancing the mine as far as I know.

CAVANAUGHBILL: Okay. And do you -- is that part of the reason why you find that this particular permit is at that critical stage you talked about before there's any construction going on?

HADDER: Right.

CAVANAUGHBILL: Based on that I have nothing further.

GANS: Okay. We're done with this. I mean, you're done with this witness.

CAVANAUGHBILL: Yes.

GANS: Okay.
CAVANAUGHBILL: We'll save him for potential rebuttal though.
GANS: Oh, yeah. I want to make sure the panel members have any questions of this witness.
LANDRETH: Not at this time.
GANS: Okay. Thank you very much.
HATTER: Thank you.
CAVANAUGHBILL: Call back Glenn Miller.
GANS: Okay.
CAVANAUGHBILL: Good morning.
MILLER: Good morning.
CAVANAUGHBILL: Could you please state and spell your first and last name for the record?
MILLER: My name is Glenn Miller, G-L-E-N-N M-I-L-L-E-R.
CAVANAUGHBILL: Okay. And Mr. Miller, what is your profession -- or Dr. Miller, I'm sure.
MILLER: I'm a retired -- recently but still going to work pretty much every day professor at the University of Nevada.
CAVANAUGHBILL: Okay. And what do you teach there?
MILLER: I taught a lot of courses in (indiscernible) chemistry, some policy related issues, and primarily environmental toxicology and analytical chemistry. (Indiscernible) mix of things.
CAVANAUGHBILL: Okay. And how many years did you do that?
MILLER: 41.
CAVANAUGHBILL: What's your background education?
MILLER: I had a bachelor's degree in chemistry from the

University of California, Santa Barbara and Ph.D. in agricultural chemistry from University of California, Davis. I spent a year working an EPA lab in an Athens, Georgia research lab. And since 1978 I've been on the faculty of the University of Nevada.

CAVANAUGHBILL: Okay. And are you currently on the board of Great Basin Resource Watch as well?

MILLER: I'm not employed. I'm on the board.

CAVANAUGHBILL: Right. On the board.

MILLER: Yes.

CAVANAUGHBILL: Okay. And how long have you served on the board of Great Basin Resource Watch?

MILLER: Since it was formed in -- if memory serves me in the mid-90's. It was previously called Great Basin Mine Watch.

CAVANAUGHBILL: Okay.

MR. MILLER: It changed about 20 years ago -- 15 years ago.

CAVANAUGHBILL: And what was your particular interest in serving on the board?

MILLER: That I've had an interest in mining since I first came in 19-- -- I think '79 or '80. I became interested in mining issues primarily associated with public lands management. And since that time, I've become interested in looking at a variety of issues. One is sort of pit lake chemistry, but also we've spent a lot of time working on mining remediation using bioreactors at the sulfate -- or sulfate produced in bioreactors that live -- online; and a fair amount of work on related issues of closure and precious metal use with the staff at the Division of Environmental Protection; and looking at some of the issues of closure of a long-term impacting issues that I think everyone recognizes is important for maintaining that mining industry in the state.

CAVANAUGHBILL: Okay. And you stated that you've worked directly with the personal here, the Nevada Department of Environmental Protection?

MILLER: Yes.

CAVANAUGHBILL: Have you done research along these lines as well?

MILLER: Yes, we've done quite a bit of work on acid mine drainage remediations using these certain types of bioreactors. And we just looked at them with the staff from New Division who was very helpful. It's on the clip on how chemistry changes the drainage from precious metals which has been quite interesting. And good and bad news in that area as one might expect. But something that has a long-term potential impact on water is (indiscernible).

CAVANAUGHBILL: Okay. And have you written on the subject as well?

MILLER: We published a fair -- several articles on mining. We published an article on pit lakes in the 90s. My interest first evolved there. We've done talks on acid mine drainage remediation and mining in general.

CAVANAUGHBILL: Okay. Now, serving on the board of Great Basin Resource Watch since its inception, correct?

MILLER: Yes.

CAVANAUGHBILL: You've been involved in the review of many water pollution control permits?

MILLER: Yes. Much of it initially was on federal EIS's and that sort of thing that water pollution control permits and the data that has been generated is required by the permit applicants to see how that water quality may not have changed.

CAVANAUGHBILL: Okay. And we've in our hearing have discussed concerns regarding pit lakes. Mr. Hadder mentioned some of those as well. But with your knowledge, what are we talking about in terms of quantity of pit lakes here in Nevada?

MILLER: This is -- the Moly pit is one of several. There's a list at the end the EPA has provided that has 60 to 75 potential pit lakes. Many of those are dry. And some will be changed depending on whether they're infilled or not.

CAVANAUGHBILL: And that's all in Nevada? Sorry.

MILLER: They're all in Nevada.

CAVANAUGHBILL: Okay.

MILLER: And there's probably going to on the order of 20 to 35 pit lakes in Nevada, perhaps more. There are some that are really quite small that are a few acres. And then some that are -- at least one, that is now reported to be the largest lake entirely within the State of Nevada. So it's a major resource. Probably on the order of 1.5/1.8 million acre feet of water will be at the bottom of pit lakes at the end of -- well the next couple hundred years depending on how fast they fill. And this is a major, major -- contributed more water in pit lakes in Nevada including the Moly pit that all of the other man-made lakes -- human-made lakes, I guess, in the State of Nevada, all completely within the borders of the State of -- let me repeat that. More water in pit lakes then all the water in man-made lakes included within the State of Nevada. That excludes Lake Tahoe which has a small dam on it that holds a lot of water as well as Lake Mead. But all the other reservoirs in the State of Nevada will have less water than the pit lakes that will be greater. So it's a big issue. It's a major resource issue that I've been concerned about for -- since the early 90's.

CAVANAUGHBILL: Okay. And what is the water quality like in these pit lakes?

MILLER: It varies considerably, actually. There's some where you have service water inflow that's going to be not so bad, but most of the pit lakes, if not all of them that I've seen that've been filled from the bottom -- just to reiterate when you create a pit, you drop below the water table, you have to pump that water out. So you drop the water table to the point that you're not going to have water flooding your two million dollar haul trucks. And so you drop the water table. In some cases that's considerable. In some cases it's fairly well contained. But it ends up being a regional effect usually on the ground water table when you drop the water table in order to mine that -- mine whatever mineral you're mining.

CAVANAUGHBILL: Okay. And in your review of these different projects, have you reviewed all those (indiscernible).

MILLER: Yes, I've reviewed many of them. Yes.

CAVANAUGHBILL: Okay. In you review of that how are you seeing what the quality level that's predicted by the geochemical models versus what we're seeing at this point after the pit lakes are there?

MILLER: I think it's safe to say that, you know, that all of the ones that I've looked at the water quality has been quite a bit poorer than what was predicted. And it's gotten to be, I think, kind of of the state of knowledge, as far as I'm concerned, that the models -- the current models that are used to predict pit lakes grossly underestimate the amount of contaminate load that's in it.

I might mention that sulfur is a primary concern here, because if -- if when you drop the water table regionally you create this cone of depression that makes and far outside of it -- of the pit or the mine area and when you drop that water table whatever sulfides are in there -- and sulfides usually exist in areas that are not -- that have been flooded or whatever the geology might be, but when you drop that water table, oxygen comes in to replace the water. It's not a vacuum. Oxygen will flood in to -- or air will flood in and be present. That air -- usually all the oxygen in there will be consumed by the sulfur to oxidize the sulfur to sulfuric acid or depending if there's carbonate in there, maybe like a sulfate.

Then when the water table recovers over time, that is all going to be rinsed -- most of it's going to be rinsed in the pit. And so when you have a prediction of -- and I've seen several of these where the water quality is -- is going to be very good, less than 200 milligrams per liter as is the case with the molybdenum mine we're discussing today it's -- it's -- I don't want to use it -- yeah, I'll use it. It's absurd. It's just no way that you're going to have sulfate that's going to be less than 200 milligrams per liter. Coal from a point -- coal as an example; very good water actually. Plenty of carbonate in it and it's neutral. But it's also gypsum satured, meaning it has 12 to 1400 milligrams per liter of sulfate in it. Lone Tree pit lake which was grossly underestimated has needed 70,000 tons of lime to neutralize it.

So when you say a pit lake it has less than 200 milligrams per liter of water. And the flow is from underground. And it has sulfide in it. It's just not going to happen. So it's a -- it's a -- it's a model that has been used consistently and it seemed to be accepted by everyone, but it never, to my knowledge, proven to be the case. They're always way under estimated. So the quality of water in that pit lake is going to be degraded.

Now, if it's sulfate, I have to add here -- if it's just sulfate, which is not terribly toxic, you can still maintain a quality of water if that's the only down in there, but if you can't get sulfur right -- if you can't get sulfur right, everything else is going to be amiss also. It just -- it just -- sulfur is a -- is a mix sulfuric acid that will drive molybdenum into the pit lake if it's acidic water that comes in. We can neutralize that, but with lime as poultry is done or (indiscernible) is done, which are both potentially good sources of reasonably good water. But it is still the case that you really don't have an idea of what's going on with that pit lake. And until the scientific understanding of modeling of the pit lakes have matured and are successful, and it hasn't been yet, it's -- it's -- the water quality cannot be -- you don't know what it's going to be like. So you don't know if you can pass -- potentially pass.

And I'll mention one other issue too as far as the -- as far as the regulations. I will interpret this because I was involved in legislation and regulations that developed this. It has -- the bodies of water which are result of mine pits pending treated water table not created empowerment which has the potential to effectively to adversely to help humans (indiscernible).

The other issue that I think needs to be considered with these things is this whole issue of beneficial use of creating something that is going to have some long-lasting positive impact for communities and the environment. There's this real danger of having a pit lake that just exists at the bottom of a pit that maybe 3, 4, 500 feet below the surface. If that will support fish, men -- maybe it's women, but mostly men are going to get down there, and they're going to fish. So there's inherent danger of stabilization of those slopes that -- that prevents a tremendous risk and will continue for -- it's geologic impact for a very long time unless there is some planning part of this -- this beneficial use concept. We're going to have beneficial use, and we're going to have access to the pit lake we're going to have -- make it -- make it largely safe for future generations. And that is not -- that's not really been considered at all as far as I can see in the -- in the analysis of the mine.

CAVANAUGHBILL: Okay. And you mentioned that you were talking about the other mines and problems with the pit lakes. Is the agency aware of the same concerns?

MILLER: The agency is aware.

CAVANAUGHBILL: And the model that was used for the Mount Hope Pit Lake was the same model that's been used with the others?

MILLER: It's what I call the Rhine model. It looks at the release of contaminants around the surfaces that people rinsing off the surface of that pit lake in there. But, in fact, the way that pit lakes fill is you drop the water table reasonably and the water comes back and it fills. And all that oxygen that has probably been consumed by the sulfate -- or the sulfur, all of those contaminants then are rinsed in the pit lake.

Because one of the issues of pit lakes is most of them -- and this is one of them, the moly pit is going to have enough evaporation that it's going to have an inflow of water into the pit lakes. So it's a terminal source. And that's -- that's also -- all the water that, you know, recovers flows in the pit lakes and so that contaminant will be dispersed fairly high.

Now, there is examples where those pit lakes have flown out. And one of the examples is Lone Tree where the wells around that area where water has actually migrated past the pit's surface and contaminated that, but I will grant that most of the pit lakes probably are going to have water flowing in over the long term because evaporation more water comes in. So it's a net inflow.

CAVANAUGHBILL: Okay. You also mentioned that there aren't really any other models out there that are matured to be used.

MILLER: Not to my knowledge.

CAVANAUGHBILL: In your comments to -- and you were involved in drafting the comments from Great Basin Resource Watch, as well, correct?

MILLER: Yes.

CAVANAUGHBILL: In your -- in comments, what is it that you were asking the agency to do if they don't have a different model that they can use to better analyze the pit lake? You mentioned beneficial use. You mentioned a planning process. But what is -- what is it that you believe the agency failed to do?

MILLER: This is a difficult issue and we have had discussions with the agencies regarding this is how do you know what the water quality is going to be, and how do you really get a handle on trying to determine what it is. It's difficult, because there are no really models that worked really well for these pit predications. But on the other hand, what you can do is designate -- and this is something I think the commission has the authority to do, designate -- require that the Division designate -- have the agency designate a beneficiary of that pit lake so that if it's wildlife, if it's recreation, or other uses that have some impact on how that pit lake is supposed to be developed and also closed. And because the pit lake isn't going to exist until the mine is closed, but at least during the planning process there should be some way of saying this is going to be recreation; this is going to a wildlife habitat, that some ability to manage that beneficial use. And right now that doesn't exist. Pit lakes in general -- some have been made sleeper, good example, made of (indiscernible) really quite a spectacular pit lake Helms Pit in Sparks is another example of beneficial use. But until there is some beneficial use and some idea of what is going to happen to that over the next several years, kind of a 500 year, after that I don't really care, but at least it's going to be 500 years that that pit lake will be there. That you -- we need to be able to look at those pit lakes and say we need to manage those for some potential use. Keep the risk down both physical and chemical risk down to use them.

CAVANAUGHBILL: And you believe that will address the concerns about the degradation of the waters?

MILLER: It will go partially towards that. You can do a variety of methods. The three of us have been involved in some discussions and other pit lakes in other states where there's going to have to be water treatment for the (indiscernible) year or beyond. One of them is a pit lake water treatment that it's going to drain out. This is not going to drain out. But there is -- it will require water treatment for a very long time. They put that into their plans so that they have money to treat that water if it flows over the pit for in perpetuity. After 200 years I think it's in perpetuity. But you can do things as long as you decide here is what we would expect this pit lake is going to do. And we could -- we could -- you can treat water if that's necessary.

If that's what the plan is originally, you can't drink the water (indiscernible).

CAVANAUGHBILL: And with the plan -- with the permit currently not including any beneficial use for that pit lake, how is the bonding set up currently under that?

MILLER: Now, that's something I'm not -- I have not looked at the bonding. It's sometimes hard to figure out exactly what the bonding is used for. I have not -- this -- I have not looked at -- there's a lot -- bonding is -- bonding is required for -- mostly for surface reclamation. And that bonding I have no -- that bonding authority. But as far as how you handle long term -- the uncertainty of long-term water management in a pit lake is such that you don't really have a good handle on bonding for it. But at the end, if you agree up front it's going to meet this beneficial use, this water quality standard, then, in fact, you have to -- you can go ahead and demand whatever is necessary to meet that particular beneficial use standards.

CAVANAUGHBILL: So at this point, the permit, if it doesn't designate with a beneficial use, what you sir -- what are the designated the pit lake has?

MILLER: It will be sitting at the bottom of a very deep pit with nothing happening to it. And it's a waste, at least in my opinion, that coupled with all the other pit lakes is a waste of resource. And right now there needs to be a better way of regulating these pit lakes, because they are impacts that are millennia of long impacts. You decide now with the people that are making those pit lakes, you need to have an understanding of what's the long-term use, what's the beneficial use that might accrue.

CAVANAUGHBILL: Okay. And if you could take a look at Exhibit D. Are you there?

MILLER: Yes.

CAVANAUGHBILL: Okay. And you recognize this document, correct?

MILLER: Yes.

CAVANAUGHBILL: Okay.

MILLER: I have not reviewed it for quite some time.

CAVANAUGHBILL: Are some of your concerns stemming from this which, maybe if you could just identify it for us.

MILLER: It's -- it's -- it's basically the structure of how these studies were done. If they use -- again, they use these Rhine laws to look at the meter, maybe two meters, of (indiscernible) you get some idea of what the flushing is for these two meters. They don't do at a kilometer or two kilometers away where you still -- where you may have water drop off stations and then all of that flush in. They look at pretty much these Rhine Models. And what they've done is probably not terribly inappropriate. That's the way it is. That's not the way it is. You drop the water table and you can have flushing. Some studies in Lone Tree show that that was the case; that you could not use that Rhine Model. It did not account for the amount of sulfate -- sulfuric acid that came in. Because they had to put 70,000 tons of lime since 2006. And a whole bunch more of what's called trona, sodium carbonate to neutralize the water. And they realized that this Rhine Model using was not able to predict what the ultimate water quality was going to be and what they needed to do to treat that water. And this is -- this is consistent with that Rhine model approach.

CAVANAUGHBILL: Okay. And if you could look at Exhibit 6.

MILLER: 6.

CAVANAUGHBILL: In the black binder.

MILLER: 6.

CAVANAUGHBILL: And this is the --

MILLER: Gray binder.

CAVANAUGHBILL: Oh, is it gray? Sorry. This is the 2008 waste rock and pit wall rock characterization report.

MILLER: Yes. Yes.

CAVANAUGHBILL: And are some of your concerns stemming from this report as well?

MILLER: Exactly, how that -- the -- the pit lake wall is evolving is -- yeah, that's pretty much same thing exactly. But the physical understanding is we're all (indiscernible).

CAVANAUGHBILL: Okay.

MILLER: And it's the same issues. I mean, there's a lot of geochemistry done here on the walls, and I don't think it's -- I'm not arguing that it's not correctly -- correctly done. It just -- it just it's not really an adequate and appropriate way of considering what's going to happen to a pit lake. And this is the standard way it's been done. It's never (indiscernible) that I can see.

CAVANAUGHBILL: And this was raised in your comments and discussed with the agency as well?

MILLER: We have talked about this, yes.

CAVANAUGHBILL: Okay.

MILLER: My -- my -- I'll call it my sermon (indiscernible) --

CAVANAUGHBILL: So numerous occasions.

MILLER: On numerous occasions.

CAVANAUGHBILL: Okay. But directly related to Mount Hope, what is the distinctive -- because you haven't appealed other water pollution control permits for --

MILLER: I think it's time. And maybe I don't want to put the focus on this particular mine, but it's time to begin to say this isn't sufficient. This is not what we need to do. As a state as a society to protect the water resources throughout the state. And that's, I think, part of -- this is also -- as John Hadder mentioned, this is virgin territory. It's not expansion of an existing mine. I mean, if you look at the Robinson project, that's an example of historic mining. I am a big fine of Mining and Robinson, because they are doing things to clean it up. I think that Yerington, another bad site in the state, re-mining makes a lot of sense. But an aversion country like Mount Hope is it's let's get it right the first time.

CAVANAUGHBILL: Okay. I have nothing further at this time.

NUBEL: Chairman, some of the issues brought up in this testimony are highly technical. Do you mind if I have a few minutes to discuss some of the cross-examine? Just a couple minutes before I get into it?

GANS: Okay with that?

CAVANAUGHBILL: Yeah, no objection.

GANS: Okay.

NUBEL: Thank you.

CAVANAUGHBILL: Taking a short recess?

GANS: Want a short recess?

NUBEL: Sure, yeah. That would be great.

GANS: About how long do you need?

NUBEL: Five minutes.

GANS: Okay. It is 10:30. We will come back at 20 minutes to 11.

(Recess taken)

GANS: Okay. We'll reconvene. It's 10:41. So if you can proceed, Dan.

NUBEL: Yes. Absolutely. So Mr. Miller, one of the issues that you brought up is that these studies or these mine studies can't get the sulfur right, which means that it leads to all other forms of contamination?

MILLER: Yes.

NUBEL: Okay. So wouldn't you agree that each mine sight is unique?

MILLER: Not with respect to sulfide oxidation. It is common practice that if you drop the water table and you suck in air, you're going to oxidize the sulfide minerals pyrite whatever sulfide minerals there are. And so you're going to have that draining in as that water table recovers over time.

And so it -- it's interesting if you look at the models that, you know, the ones I've seen that have not been -- haven't filled yet. What they do is they say here's the model water in 5 years, 10 years, 20 years, 30 years. And they show sulfate increasing very, very slowly, when in fact, they will increase at a much more rapid way then that as it flushes in. And there's just not an understanding of what the geology is some distance from the pit. So I -- I -- you know, there's no question that -- coal for instance was a neutral -- there's plenty of carbonate in that system so it's neutral. And the water quality is not that sleeper was terrible. You added a tremendous -- they added a tremendous amount of lime. Lone Tree was terrible, very acidic water. Those were not predicted to be that quality prior to mining. In fact, they're ordered to (indiscernible). And that's why I argue if you can't get sulfur right, the rest of that is problematic. Also because that's going to be the driver for the metal released into the way.

NUBEL: Didn't some of the sites that you discussed actually contain a lot higher levels of pyrite then the Mount Hope site?

MILLER: That I can't say, because you don't know -- if you look -- just looking at the wall rock, that's different then looking at the -- and that's what makes one of the really difficult things that are predicted in pit lake water quality. Is you just look at the wall rock and you decide how much pyrite. I mean, prediction of the Lone Tree was going to be -- it had potential for acidity, but it was probably going to be near neutral, and it was way, way acidic. Because they did not have the -- they did not have the geochemistry correct.

Now, I have to say I have not looked at all of geology. I have gone through that tremendous amount of work to look at what I would predict would be in the pit lake. But I suspect that if you have really any sulfur in the cone of depression you're going to have what's called a gypsum saturated lake. You're going to have over a thousand milligrams per liter of sulfate. And it depends on what the calcium concentration is that precipitates, but you would probably be over a thousand milligrams per liter.

I don't -- you know, it's -- we can all sit here and kind of argue about this, but we really don't know. And that's the problem I have with this pit lake is that no matter what it is, we need to have some -- some expected use so that the proponent -- the mining proponent is going to be responsible for making sure that that beneficial use is there. We all know the pit lake is going to be -- unless they decide to refill it, we all know the pit lake is going to be there for centuries and beyond. What we can't really know is what the water quality is going to be. And so we need to designate what the water quality will be based on the beneficial use and then require a mining proponent meet that use. That's -- that's what I'm arguing. I'm not saying -- I'm saying right now that we rely on these pit lake models. And I've seen them say, you know, there's going to be this out to 300 years and three significant figures. It's crazy. I mean, it's just -- it's just not even in the realm of possibility. And it's not even in the realm of possibility. And so what we need to do is to have -- is to have some expectation that -- how that potentially should be expected. That's my opinion.

NUBEL: Given that the expected water quality, as you admit, of any pit lake, you claim that it's highly uncertain, right?

MILLER: Yes.

NUBEL: So isn't it an effective approach to continue sampling as mining commences?

MILLER: Even a sampling is really not -- exactly where do you sample from and how do you do that at a pit lake? I mean, that's part of the science that doesn't exist right now. And so that one of the options I think is, you know -- is to simply -- is to simply say we have looked at this. We think it's probably going to be close to being neutral. And if it's going to be neutral, this is the beneficial use. We should have this pit lake, and we're going to require that that be maintained, whatever it might be. We're going to have access to it. So we're going to do those things so that it won't be a burden on society. It won't be just a resource evaporating (indiscernible). But we're going to make it something that's useful. And then -- and then -- and then we work towards that end.

NUBEL: Right.

MILLER: But predicting exactly what the pit lake is going to be I think is just impossible at this time.

NUBEL: But you -- you keep saying that there should be beneficial use, right?

MILLER: Yes.

NUBEL: Are you aware of Nevada statute or regulation that requires NDEP to designate a beneficial use?

MILLER: I -- I'm not aware of one. It is -- it is -- they have -- I think with respect to the environmental commission, they have the authority under the NEC, one of the ones that I mentioned that to require designation of a beneficial use. And I think the NDEP should be recommending that each pit lake have a beneficial use in order to protect. Because I, you know -- I've talked to staff, and I -- I don't think that we disagree exactly on how difficult it is to predict pit lake water quality. But the problem I have is the fact that a predication came in, and I think that it's hopelessly unrealistic. And so we use that number to say it's going to be really good water quality, so everything's fine. That's the part that I really think is problematic; is not having a realistic understanding of what the water is. But then saying, well, this is what we -- we think that it's -- it's going to be based on whatever, but -- and so therefore this should have that beneficial use and then require it that mining component to meet that potential use. Now --

NUBEL: But you would agree that we're here today to decide if NDEP abused its discretion in issuing this permit, right?

MILLER: I -- I think that this permit is so uncertain, that whatever litigation that they can do on this is require a -- require a beneficial -- because right now they were saying we're going to not have access. We're just going to let that water sit there. We don't know what it's going to be. It's going to be at the bottom of a deep whole. If people go down there, that's their problem. It's kind of what makes sense. And this is certainly new. I will not disagree with you that -- that there's no requirement that the NDEP require beneficial use, but on the other hand relying on the water quality prediction, I think is equally wrong, because it's so unrealistic. So in that sense I think it's time to go back and stop and say, okay. Let's -- how are we going to resolve this issue.

NUBEL: Now, you just stated that NDEP's position and the position of the permit, is that while the people access the mine facility, then that's their problem. Did you not just say that?

MILLER: I was using that cynically. Because that's what's going to happen is the --

NUBEL: It's a yes or no question.

MILLER: Well, the Darwinian approach is their stupid enough to go down into a pit like that they should die. (Indiscernible) about that. That's a cynical statement. But it is reality. It is a reality.

NUBEL: But that's not NDEP's statement?

MILLER: No, but it is -- it's what is the -- what is actually being -- by agreeing to this -- by pushing this permit, and not having any mitigation for those risks, I think we're --

NUBEL: You're not aware that there will be fencing and signage?

MILLER: Fencing and signage last (indiscernible) some other places in central Nevada.

NUBEL: And you are not aware that there will be long term bonds in place with the BLM to ensure that the signage and fencing continues throughout the life of the mine?

MILLER: This is a general problem for the State is if that's the way we're going to close pit lakes --

NUBEL: It's a yes or no question.

MILLER: Well, it's not a yes or no answer. If you're going to require that signage and fences are sufficient to protect the public, that's incredibly unrealistic. So you know, I think if that's the way that these pit lakes are going to be closed, I say wow, that's way, way beyond what I think is a realistic attitude towards these many pit lakes -- many pits that we have. And there needs to be a safety assessment done on these that is beyond what I think has been done here.

NUBEL: But aren't there certain pits that would be not necessarily ripe for beneficial use and inherently dangerous?

MILLER: There are some. And that has to be -- that has to be taken into consideration. I agree with you. There's right now there's pits proposed that are very dip that may not even have any water at the bottom that are dangerous. And that -- ultimately it's going to require some consideration for that.

NUBEL: In fact, under your approach of designating every pit lake as a beneficial use, you might in fact be inviting the public to a hazard, right?

MILLER: Yes, but the -- the whole issue is one -- I don't disagree with that. I don't disagree with that. The issue is attractive nuisance. If you have the potential, you know, even putting fish in it, and Department of Wildlife said, if there's a lake that will support fish, people will put fish in it. If people put fish in it people will go down there. So there's an attractive nuisance issue is one. And that's part of what I think needs to be considered in permitting mines is what is going to be the end product. And that's where I think that this permit is -- is -- is lacking, because I do think that there's legislation requires that any body of water should not present a risk to humans, avians or terrestrial life, and I think this does. This is -- I'm not sure what the -- it could be close to 500 feet from the surface. So is it going to be recreation? I don't know. But the design of it needs to take that into consideration is what's going to happen over the next several years --

NUBEL: Right.

MILLER: -- not later.

NUBEL: But you would agree that at the -- once mining is finished and the pit lake begins to form, there will be approximately a 900 or 1,000 foot steep slope to get into the pit lake?

MILLER: Right.

NUBEL: Are you suggesting that we should allow the public to transverse those slopes in an attempt to fish?

MILLER: What was the question -- central Nevada allow -- sometimes poorly defined that people will get to

the bottom of these pit lakes -- they will get to the bottom of the pit lakes.
NUBEL: But you're saying that we should encourage it by designating a beneficial use.
MILLER: It's a safer use. It's a safer approach. I think that's something worthwhile to consider.
NUBEL: But isn't the safer approach to put up the fencing and signage to encourage the public not to enter a dangerous pit?
MILLER: I think that's probably going to be part of it, but it's a question of how long. If you have a big four-wheel drive 350 Ford pickup, how much does it take to push with that fence down? I mean that's part of the issue is what is the safe approach for dealing with these geologic impacts. And I'm not disagreeing with you that whatever if there's access made to them it should be safe. It should be safer than not having access to them. Exactly, how that's designed. That's beyond my expertise, but it has been a concern -- I think that's been a concern of a lot of people exactly what is going to be at risk with that.
NUBEL: Okay. That's all the questions I have for now. Thank you, Mr. Miller.
CAVANAUGHBILL: I have a follow up question based on Mr. Nubel's questions. So if -- so you're saying that the Commission can direct the agency to establish a beneficial use. If that were done, Mr. Nubel was

asking about the mine pit and the slope, couldn't the project then also develop -- the pit would be circumference differently?

MILLER: I mean, that's part of what -- what needs -- needs to occur here. During the design of a mine is you design for mines -- mine closure when you take the first shovel full of soil away when you're digging the pit. And that's part of this -- doing this now rather than -- rather than at the end of mining. You plan for closure. And I don't think anyone disagrees that that's a standard issue in any type of recommendation. But pit closure is a challenge. We have never -- except in the last 50 years, we haven't really been able to do this in human history. We now can dig a pit that's 2,000 foot deep. And you know, that's a pretty deep pit. And we haven't really addressed the point how are we going to deal with these over the long term. And that's something that I think that it's time to do it now.

CAVANAUGHBILL: Okay. Thank you. I have nothing further.

NUBEL: I don't either.

LANDRETH: Mr. Chairman, I just have on question going back, and maybe you've answered it this as sufficiently as you can, but let me see if I can find what you said. Oh, the treatment dollars, you were saying there might be a need for water treatment in the plan, and that those dollars would be billed into the plan, you know, into the bond. Is there anything else you want to say about what other remedial efforts could be taken during the planning process with respect to the beneficial use designation? And I think maybe you just answered it a little bit by talking about the pit walls and doing something about the depth.

MILLER: It's -- it's -- the economics of mining are very complicated. Laying back walls are very expensive and that's a very difficult thing to do. So it requires some fairly extensive geotechnical analysis. If you were going to access, what's the safest way to get in there? Is there a safe way? There may not be a safe way to get in there, but what is the safest way to get in there? But that should be done as part of the mine plan as it evolves with the expectation that whatever water is down there is going to have -- it will have some water quality. And if that has to be treated to meet that beneficial use, so be it. And so you need to have that.

Part of the problem with a lot of this is the water quality in that pit is really not going to be known until water starts coming in with any great certainty. You can also stick reverse osmosis units down there, very expensive, but it is a challenge. But it is reality of mining that you're going to have water that's probably going to be degraded if nothing else by sulfate. And that will limit the use of that water. And so if you designate what that water use is, then you'd at least have an argument saying well, you guys, 100 years ago said that there -- 50 years ago said that you were going to have those beneficial use. You've got to meet that beneficial use. And that's part of the, I think, the whole mine planning activity. Now, because we have so many pit lakes and it's time now (indiscernible).

GANS: Dr. Miller, I have a point -- (indiscernible).

PORTA: Yeah, Dr. Miller, given the absence of any other, I think in your testimony there were models that are of better predictability what other recourse would the Division of had to model this lake. I mean, and even if those models were out there, there's still this -- a level of uncertainty, no matter what you do.

MILLER: You know, I agree with that accept that the model that was used on this one, I believe, gives a very false impression that it's going to be pure as the driven snow, effectively. And I don't want to (indiscernible) --

NUBEL: Yeah.

PORTA: -- it's going to be very good water quality. That has not been the case. So I think that since we have so much uncertainty in it, it's better to say, if you guys produce this model that's going to be drinking water quality -- and I think this water is (indiscernible), I'm not sure. I think it would be drinking water quality. And you say, okay, do you think it's going to meet that standard? That's what got produce is drinking water quality. I would not take that deal if I was a mining company. I would say that it's going to be degraded and let's go let this wildlife or recreational use or something like that. But that's -- that's what -- that's what I would default to say. If you predict this water quality is going to be this good, we're going to make that the standard.

PORTA: Okay. And would you agree that then really a third party evaluation of this is kind of moot, because we don't have the tools and resources now to adequately assess this potential?

MILLER: I think -- and I have -- I think with respect the Division of Environmental Protection Bureau of mining is the best in the book. Let me say that first. But the expertise is something that is from a regulatory body is a scientific just having that cadre of bunch of people. Minnesota has a great -- (indiscernible) used to be there, and he was one of the best acid mine drainage guys in the world. And I'm not saying that these guys aren't really good, but the expertise, I think, is probably mostly in consulting industry mostly people that have worked in this area for a long time. And that's where I think that third party evaluation makes a lot of sense. And I'm not imputing the integrity of consultants on this project, but there is -- there is a consultants to the mining company to get a permit, and there is a -- there is an inherent bias. I've consulted, and I want my client to win --

PORTA: Yeah, yeah.

MILLER: -- (indiscernible) within the ground of truth, but it is -- it is I think reasonable to have an outside expert look at it. It may not have the same -- same potential bias.

PORTA: Yeah. I just feel given the tools that are out there now, I don't currently believe their certainty is going to be any better than Great Basin's certainty or NDEP's certainty. So I'm struggling with --

MILLER: (Indiscernible) all that certainty.

PORTA: the -- yeah. I'm struggling with the third party option.

MILLER: But it's still -- it's still something that is -- I guess I would argue for because -- and I've had a lot of experience with the -- the BLM made comments that came back. And I said this doesn't sound like BLM. It turns out the people that did the original work commenting how bad I was. And they did not clean that up. And this is -- I'm not suggesting that's the way it's done here, but it was a -- it was clearly, and unambiguous one-sided opinion that came through the BLM that having another party look at that, someone who's independent, I think would have been terribly helpful. That's -- that's just the point I'm making.

PORTA: Yeah. And just one last question, Mr. Chairman. With regard to beneficial use of these pit lakes, isn't that more in the regulatory reign versus a permit appeal process for us to be discussing this today? I mean, to me it seems inappropriate. We're here to discuss the merits of the Division's actions on this permit. Did they act appropriately? And we've been talking about beneficial use, which is more a regulatory issue that should be put forth and concerned with. And the reg should be changed.

MILLER: I recognize that argument, but it is -- it is the fact that the decisions are being made, water quality standard -- water quality prediction that I believe is so far off, that I think it's appropriate to have somebody else look at that to a third party. But what is a way of remediating that to make that -- make that less impacting over the long term is by having -- is by having, you know, some other stipulation in the permit that says if that's the water quality you think it's going to be, we'll go with that. Here's the standards. Here's what you have to meet. That is something that I think is within the realm of the agency. It's not required. It's not required. But within the realm of the agency to make that decision to protect public interest over the long term.

PORTA: Okay.

GANS: I got to follow up on some of the things that Tom just said. I have two questions. Tom got the first one. When you were asked to look at Exhibit D, and please correct me, I'm not trying to put words in your mouth, because I want to understand what you said. You said something to the affect that this has been done for a long time, but it's never correct. Is that kind of -- did I summarize it correctly?

MILLER: The state models -- this was a 2010 study. So that was -- that was nine years ago. Pit lake models weren't even required until -- until we suggested the in the early 1990's. So this was -- or mid-1990s. So this was 15 years of pit lake studies that have gone until this one was done. That's not a long time. And there was no -- there was no real -- they were not authentically measured to see how well they worked, because they were just stated, this is what's going to happen.

We have two or three pit lakes now that suggest that those models were really inappropriate. And if we start now we'll learn exactly how the water -- what the physical model should be. And so we -- I have not -- and now I guess I would challenge anybody to say, here's a pit lake model that occurred prior to the pit lake filling. And there's a lot of models that come after the pit lake filled. And they said, oh, well, okay, we made a mistake, so now we'll model it to fit that data. And that's been done two or three times (indiscernible) was done. But if you model it the predictive ability when you're in the permit process, I have not seen one that has been even reasonably close. I think he's --

GANS: So if that's the case -- here's where I'm going with this. It seems like, if I understand what you said, where do they go? There's no model out there that's going to do us any good. There may be another independent study or kind of consultant or expert. But I'm wondering how much extra light that's going to shed also. I'm just not sure we're going anywhere. I know your concern, and I -- I don't fully disagree with it, because it's -- it's -- you know, there are things that are almost unknowable in some of these cases that you make a big error with a 70 million ton waste (indiscernible) you made a very big mistake. And that -- but that is evolving over time. And I think pit lake models are going to evolve over time as people grow up to see these things. And that's kind of the science of it. And nobody's really talked about this until (indiscernible) in Montana was -- they looked at the chemistry of that is horrendous. And it's got the periodic table and it's spectacular chemistry. But it's really, really -- we're not going to have any pits that bad (indiscernible). It's a horrendous thing.

We're learning over time and that's the issue is how do we go from where we are now into -- into where we can make a mine -- make decisions on a mine when it's being proposed. And that -- that's something the agency is learning like all of us are exactly how to do that. We're just not there yet. And so I -- what's the mitigation. What is the way of getting around that is to say, if this is what you're predicting let's go with that. And -- and let's set up a regulation which we have an authority today saying that's -- that's what we're going to do litigate that uncertainty. And that's the issue, mitigation and uncertainty.

GANS: So, and again, I'm trying to follow up on a little bit of what Tom said. When you talked about designated beneficial use for this, my concern with that is are we using this particular project as a whipping post? And what I mean by that is, okay, we're going to use this project to change the law. I'm concerned about that from the standpoint that asking us, this three person panel here, I have no real technical background. I don't have a Ph.D. or anything else. I know you've got pretty good -- I guess what I'm saying is so we substitute or wisdom or maybe lack thereof for the legislature or maybe where this should really take a place. I would be very reluctant to say I know what I'm talking about. We're going to tell these guys they better go out and do a designated beneficial use. I'd like to do that. I think I don't have a problem with it. I agree with you. But is this the project? Is this the time? Are we preempting a better process? And I'm wondering if this is the right venue to be doing this, even when I agree with you.

MILLER: Yes. No, I understand. And I think I understand the point and don't necessarily agree with it. What I'm saying though is that the data that we use to make the decision was so sufficiently flawed that we can get around this data by going back and saying, okay. We'll take that water quality designation and -- and we'll fix that in there. It's a mitigation of a situation with the data. I think it's very poor. And so that's -- that's -- that's my solution moving forward on this. One of things on this project is for the pit lake is to say, if that's what you think it is, that's what it's going to be, but we're not going to accept the fact that if you have -- if your calculation is way wrong, it's going to be horrendous water or it's going to have selenium in it or like Yerington pit lake does then it's going to be a real hazard to wildlife. We're not going to accept that. We want to have -- we're going to say at the beginning that this is a long-term impact.

But I would answer you probably, that there is a hint of that in there, that it is time to begin to look at this event in a more comprehensive manner and decide what is the long-term issue associated with this. Let's do it now, not wait a hundred years when mining may not exist and you have all these pit lakes, and there's all these problems with all of these pit lakes. That's the argument that I think we're making is that at some point in time, maybe not this project, but I think this project is one because it's a new country. It's not -- it's not like, again, a Robinson, you can't make it worse.

It is going to be better because of what the Division has done and what the company has done. But it's a horrendously contaminated site. Let's not start creating (indiscernible). And that's -- I guess that's the point I'd bring up.

PORTA: Just one follow up with regard to drinking water. That's been mentioned a lot with this pit lake and so forth. The surface waters in the State that have been designated for drinking water doesn't mean you can go up and stick a straw in it and start drinking out of it. And the statutes and regs clearly identify that it's with reasonable treatment that the water can be taken from its state to drinking water.

MILLER: I'm not proposing --

PORTA: Okay.

MILLER: -- drinking water status at all.

PORTA: -- that the water can be taken from its state to drinking water?

MILLER: I'm not proposing --

PORTA: Okay. Okay.

MILLER: -- the drinking water standard at all.

PORTA: Well, it was mentioned, and some people don't know that.

MILLER: Yeah.

PORTA: You know, if we -- the Division designates a water body drinking water, that means with reasonable treatment --

MILLER: Yeah.
PORTA: -- to a drinking water standard. Not that the water body has drinking water standard.
MILLER: No.
PORTA: So, anyway.
MILLER: The prediction was it would meet drinking water standards if that -- I believe.
PORTA: Okay.
MILLER: As I recall.
PORTA: Okay. And that -- no way would I ever suggest that it --
MILLER: Okay.
PORTA: -- be designated as a drinking (indiscernible).
MILLER: All right. I just want to be clear. Thank you.
CAVANAUGHBILL: Call Houston Kempton.
KEMPTON: And not by all the cords over here.
CAVANAUGHBILL: Good morning.
May I proceed?
GANS: Uh-huh.
CAVANAUGHBILL: Mr. Kempton, could you state and spell your first and last name for us?
KEMPTON: First name is John, J-O-H-N. Last name is Kempton, K-E-M-P-T-O-N. And I go by my middle name, which is Houston, H-O-U-S-T-O-N.
CAVANAUGHBILL: Okay. And what is your education related to mine water quality estimations?
KEMPTON: I have a bachelor's degree in Geology from Mary Washington College in Virginia, and I have a

master's degree in geology from the University of Colorado at Boulder.

CAVANAUGHBILL: Okay. And what -- you currently sit on the board of Great Basin Resources Watch?

KEMPTON: Yes.

CAVANAUGHBILL: You currently serve as a staff person?

KEMPTON: I'm a staff geochemist --

CAVANAUGHBILL: Okay.

KEMPTON: -- for Great Basin Resources Watch.

CAVANAUGHBILL: And what is your background work related before you became a staff geochemist?

KEMPTON: So I've been consulting -- environmental consultant from 1987 through 2015. So 27 years, 28 years. A lot of that in mining, oil and gas, industrial. The majority of that in mining.

CAVANAUGHBILL: Okay. And do those projects relate to water quality, as well?

KEMPTON: Yeah. I've done a lot of work for Hard Rock Mines. I've worked on projects that involve predicting water quality in mine pit lakes and a little bit over ten projects, many of those in the state of Nevada. I worked on a few Waste Rock Management plans dealing with management, that kind of thing. All related to water quality as an environmental chemist, geochemist, but not an engineer.

CAVANAUGHBILL: Okay. And what stages were the different mines at that you looked at?

KEMPTON: All stages. Many of them are in progress, expansions, that type of thing. And Dr. Miller had mentioned sometimes projects do wind up predicting water quality in a mine lake before there has been any excavation at all, so a range of conditions.

CAVANAUGHBILL: Okay. And did you actually work in terms of the actual sampling and analysis, as well?

KEMPTON: Yeah. I've done a lot of field work, sampling, hydraulic measurements, water sampling, been on mine lakes and sample water at depth to look for studies of limnology and biological productivity in mine lakes. And develop methods for measuring parameters that are applicable to models. So we talked, for example, here about the wall rock and that's the big effect the oxygen entering the wall rock is a source of pollution. So looking at methods to measure that process under field conditions. I published a paper a few years ago on that. Nobody has, to my knowledge, ever cited that paper. So I don't know that it's perfect or great, but it's at least a stab at this measurement that we're talking about today.

CAVANAUGHBILL: And that was all done from 1987 to 2015?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. So approximately 26 years?

KEMPTON: Yes.

CAVANAUGHBILL: Who would you typically be employed by? You said a consultant.

KEMPTON: A lot of mining companies and then I've also been a consultant at the Pure Land Management and EPA and the State of Colorado. Mostly I'll say private industry, but --

CAVANAUGHBILL: Okay.

KEMPTON: -- some other.

CAVANAUGHBILL: You've also sampled and analyzed existing mine lakes, as well?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. Where was that at?

KEMPTON: The Yerington mine that's called the Anaconda Pit in Yerington, Nevada. And that was for a study of existing mine lakes and sampled it three times during the year and then looked for the limnology, the turnover, the physical behavior of those lakes over the course of a year to support models of how they're going to behave in the future -- these mine lakes will behave.

CAVANAUGHBILL: Okay. And you mentioned one article you published, but you've actually published other articles, as well, in the area?

KEMPTON: I've published ten or maybe a few more peer-reviewed articles having to do with mine water, mine lakes, either in journals or in conferences where they're peer-reviewed. I have other articles in different venues, they're not peer-reviewed or they're just presentations. You know, it's more that I think they're less relevant, unless there's been a critical review.

CAVANAUGHBILL: Okay. And based on those 26 years of work, do you feel like all the estimates or the analysis that you made were reasonable?

KEMPTON: Well, they've certainly gotten better over time. One of the mine lakes that we spoke about today was the Lone Tree Mine. And there were four studies of that mine. I gave a talk on this at Nevada Water Resources Conference here this January.

There were four studies before that began to fill and one of those was one I worked on with a team of people looking at that water quality. And all of us underestimated by a lot the load pollution from the wall rock in that -- in that mine. They were under -- we talked about how the sulfur is a big indicator. Sulfates are a big indicator of how much was coming off the wall rock. And those were -- all the modeling studies were low by factors of maybe 3 to 5 on the sulfate that turned out in that lake. And none of us estimated that it was going to be really that bad -- acidic, the way it turned out.

So I've gotten better over time, I think. There was a study I did about existing mine lake. This was -- the client didn't want us to reveal where it was, but it could turn into a presentation. And it was measurements in the lake and measurements of the reaction rates on the wall rock. And we did a probabilistic simulation (indiscernible) we promulgated the uncertainty in the modeling parameters, the measure parameters into our estimates of the water quality of the lake.

And pretty big errors. And like factors of 10, 20 error on the estimates of most of the constituents in the lake and our err bars 90 percent confidence also missed some of the measured constituents. So I don't have huge confidence in the predictability of the models, although I think they have gotten better over time with more thought.

CAVANAUGHBILL: Okay. And looking -- you've reviewed all the documents. And were you involved in Great Basin Resources Watch's comments, as well?

KEMPTON: Yeah. Some of the comments I wrote pertaining to the prediction of the water quality in the mine lake and pertaining to long-term behavior of the acid-generated waste drop.

CAVANAUGHBILL: And Mr. Hadder actually said the reason for this appeal was based on an analysis that you did for Great Basin Resources Watch, which gave them additional concerns in terms of filing this appeal of the permit. Do you recall doing that analysis?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. And can you explain the concerns that you have about the current proposed permit for Mount Hope?

KEMPTON: Yes. This might take a couple of minutes, but I think I can do this pretty short. So the groundwork has been laid. So the excavating into these sulfide ore deposits, like the Mount Hope project, you expose the wall rock to oxygen and oxygen from the air. And so the pollutant in the wall rock, which are usually the wall rock or if there's backfill, the backfill that's -- that's usually the source of pollutants that really cause the water quality to be a problem and have to be treated at risk to wildlife or whatever.

So a lot of focus on the reactions in pit walls. That happens when you expose the rock and the sulfide minerals in the rock to air and the oxygen in the air. But that doesn't happen instantaneously, it happens over time. The -- the reactions have a rate. And so there's a time over which these reactions happen.

And I guess I would say here that is a fundamental property of mine waste in like the Mount Hope deposit, which is that the amount of pollution that comes out of that rock is dependent upon how much time it's been exposed to the air. How long it's been able to react. So in doing these kind of models, calculations, one of the first things you look at is how long it's exposed and how fast those reactions occur.

So all to the good here, the Mount Hope project they took a bunch of samples, I think 31 rock samples, and they subjected it to kinetic tests. Kinetic meaning rate. So they put them in a laboratory test, and they see how fast the pollution is liberated by the rock.

I should back up and say the pollutants are in the rock, but they are, essentially, entirely insoluble when they're bound to the sulfide. So it's not until they react with oxygen that they (indiscernible) things like sulfuric acid, metals, heavy metals, (indiscernible), lead, often arsenic. Those don't become -- most of them don't become soluble until it is oxidized.

So they subjected -- the Schlumberger report in 2010, various pit lake water quality prediction, and they subjected 31 samples of rock or used the analysis of 31 samples of rock is kineticus. How fast did these rocks release pollutions.

CAVANAUGHBILL: And when you say they submitted, the Nevada Department of Environmental Protection?

KEMPTON: Actually, it was the previous report on the waste rock management had selected 31 samples of rock --

CAVANAUGHBILL: Okay.

KEMPTON: -- and subjected them to. That's a 2009 report by SRK Consultants. I think that's right. But they had subjected them to these kinetics tests, laboratory tests. And in that case, you take a kilogram of rock, you let it weather with moist air for a week, and then you flush it with water and you measure what comes out of that rock. And then you do it again the next week.

And so how fast that rock is reacting, you just measure what comes out of that rock week by week by week. And in these cases, the samples were subjected to these ongoing kinetic tests. They're also called humidity cells (indiscernible) test here. They went out between I think 57 and 70 duration.

But then, to estimate what comes out of the wall rock, the model by Schlumberger of the water quality, they took the average of what came out of the rock in one week. And so they applied that to estimate what would be the concentration of what comes out of the rock under field conditions.

CAVANAUGHBILL: Let me stop you just for one second. So the Schlumberger report that you're referencing, is that Exhibit D that's in the binder there? No, the other one. There you go.

KEMPTON: Yeah.

CAVANAUGHBILL: That's the report that you're referencing there where they did the testing in one week?

KEMPTON: That's correct.

CAVANAUGHBILL: Okay. Sorry.

KEMPTON: That's okay. So they looked at the average composition that came out of a rock in a laboratory test for one week. Well, so, they applied that to estimate how much pollution came out of the wall rock in their model. So the problem is, of course, the wall rock hasn't been exposed to one week -- to the air for one week. So for example, the model begins by running out for five years. It just takes chunks of a time step for five years. Wall seems fine (indiscernible).

But over five years, there are 260 weeks. So it doesn't really make sense to use what came out of a laboratory test in one week to estimate what would come out of the rock under field conditions over 260 weeks. So is that an error of 260? Well, that'd be a place to start as to how big that error is. But I don't really know. there's refinements you would make to how the rates change over time.

But I would say that has produced a large and systematic error in this estimate of water quality in the pit. And by large, I mean like a factor of 100 or so is within a reasonable range of what that error might be. That is the amount of pollution that would come out of the wall rock.

And then by systematic I mean it has -- it will tend to have the effect of always causing there to be an underestimate in the model relative to what is going to be observed under field conditions.

CAVANAUGHBILL: Okay. And the 2009 report that you referenced that was the waste management -- waste rock management?

KEMPTON: Yeah. 2009 or 2008. I'm forgetting which year that was. There was a waste rock management plan and then there was an environmental characterization of the pit wall and waste rock. And that might be the 2008 environmental analysis of waste rock in pit walls is at my right, and then 2009 is the waste rock management one.

CAVANAUGHBILL: Okay.

KEMPTON: Both of those last two are by SRK Consultants.

CAVANAUGHBILL: And you talked about the kinetic testing that was done there. Do you think that was an error, too? Do you think it's causing the same large and systemic problem with the underlying?

KEMPTON: No, I think that the -- I think that the tests are reasonable. It's a very standard test to estimate the behavior of mine waste under field conditions. It's a reasonable test, but it seems to have been applied in a way that has caused an error --

CAVANAUGHBILL: Okay.

KEMPTON: -- in the pit layer. I don't know about the waste rock. I don't know how it was applied in the waste rock management plan, other than to help in categorizing rock to decide whether it was acid-generating or non-acid generating. Which was, to me, seems well done, right? I mean, they did test to determine whether the rocks could produce acidic drainage. That is do they have a chemical analysis of acid-generating potential versus acid neutralizing and look at that balance.

And then they supported that with these laboratory kinetic tests, which are empirical long-term tests, in this case, out to a better part of a year or more to see empirically, do they actually produce acid drainage under field conditions. And there were not any big surprises that I saw, which is if you think they're going to be acid-generating, they tend to behave like that under field conditions.

CAVANAUGHBILL: Okay. And what percentage did they find that would be acid generating?

KEMPTON: Well, of the waste rock it's whatever -- I don't know the percentage, but the estimate are 450 million kinds of acid-generating rock out of 1.7

billion tons total of waste rock.
CAVANAUGHBILL: Okay.
KEMPTON: The plan, to the credit of the waste rock management plan in the Mount Hope plan for the mine is to analyze during mining operations, assay samples that are coming out, and route the waste rock and I presume ore to the appropriate facility based on a more refined analysis of whether it's going to be acid-generating or non-acid generating or whether it's ore. But that's a very standard thing to be done in mining. But it looked like a responsible plan.
CAVANAUGHBILL: It what?
KEMPTON: Looked like a responsible plan for doing that.
CAVANAUGHBILL: So what is -- so the concern now with the appeal, and if you could turn to Exhibit C, your concern about this error in their testing, was that pointed out to the agency in the comments?
KEMPTON: Yes.
CAVANAUGHBILL: Okay. And do you recall what their response was?
KEMPTON: Well, they seemed to feel like the model, as it was, was okay and then it could be refined going along as mining progressed and they would have more information on the rock that's (indiscernible). I agree, they'll certainly have more information and they'll be doing more drilling, all to the good to do that.

But I guess I'd reiterate my concerns is that we will all regret this if this goes through with the model as it is right now because it leaves a trail of an error. It isn't just that we don't really know. It's that there's a big calculation error in the way the estimates of water falling in the mine lake have been made.

And so that's not going to look good for me or us or NDEP or SEC or anybody at the mine or the consultants or whatever. So to me, I would hope that it would just be refined. The model would be refined and (indiscernible).

CAVANAUGHBILL: And this error was pointed out, if you look at page 20 of Exhibit C, the first full paragraph?

KEMPTON: Yes. The error in the Schlumberger (phonetic) 2010 pit lake model arises --

GANS: Where are you?

KEMPTON: Right here. Letter C, page 20, first full paragraph. The error in the Schlumberger 2010 pit lake model arises because if it's not considered the duration over which wall rock is exposed to the atmosphere when calculating wall rock (indiscernible).

CAVANAUGHBILL: Okay. And then the agency's response is Exhibit H. You have that in front of you. It was loose. It's inside of the binder in the front page.

KEMPTON: H.

CAVANAUGHBILL: Do you recall where they responded? You said they responded and said it was good enough for now.

KEMPTON: Oh, I -- yeah, they were -- I'm sorry, what page are we on?

CAVANAUGHBILL: Exhibit H.

KEMPTON: Appendix H, and I am looking through -- this doesn't seem to have page numbers on it.

CAVANAUGHBILL: It doesn't. They go by -- it wasn't paginated. It goes by the comments.

KEMPTON: Yeah. Comment 17. I might well add that it is tough to make these kind of comments. And I try and come at this conceptual error in different directions because I have reviewed a lot of these types of mine water projects. And I often don't understand quite what's going on right when it becomes critical to where I think there should be a term about the rate and load. I don't understand, and I'm not a PhD, I'm not some genius.

But I should understand it because I've done these for years. I've done a lot of these pit lake model modeling kind of studies, and put those together. And so in writing this, I had these different red -- I have text about red flag number one.

CAVANAUGHBILL: And that's all from your -- the Great Basin Resource Watch comment letter?

KEMPTON: Yeah. I try and draw out the -- my concern by coming at this in multiple different directions.

The first thing I read a couple minutes ago about the err in the pit lake model of assumption that was pretty concise. But then those aren't very effective in a lot of cases in getting a response. And so I tried to really draw this out in different ways.

So I'm just looking, I mean, there's the comments, and then there's --

CAVANAUGHBILL: Their response is at the bottom of that next page. It says, Division response 17.

KEMPTON: Division 17, yes.

CAVANAUGHBILL: It's kind of hard to see. It starts on the following page.

KEMPTON: Community sales are utilized to simulate and accelerate the chemical weathering. That's fine. Yes. All that. Perfect. Take designed oxidation, sulfide -- yes. Okay. So -- and then I didn't disagree with these models -- I mean, these humidity cell tests being appropriate. They're fine tests, and the response from the State kind of reiterates that. And then -- so it says the permitee is required to submit an updated groundwater flow model and pit lake study.

Future iterations of the Mount Hope pit lake study will be required to incorporate many of the items discussed in GBR comment 17 field explanation. So okay. So that says there'll be updated models in the future, which I presume they say will be better. But that, to me, doesn't really address the problem that I tried to identify in my comments, which is that I think there's a calculation error.

CAVANAUGHBILL: And that -- so your belief is that the permit is based on faulty information?

KEMPTON: Yes. I think the underlining -- undergirding data supporting the analysis seemed to be okay with me. I didn't have any -- I would quibble if we -- there were smaller problems then a factor of, you know, 50 or 100 error, then I would look more closely at some of the other calculations. But in this case, I would say the conceptual approach seemed okay.

CAVANAUGHBILL: Okay. And have you actually had discussions with anyone at the agency about this error?

KEMPTON: I'm not remembering about this specific project and this specific error. We have had meetings with the NEDP as Great Basin Resource Watch a few times, and these are detailed, in-the-weeds technical kind of discussions. And so people glaze over and the conversation usually gets shut down. And I am entirely sympathetic to that, and it is my belief that these should be addressed by having small groups of the relevant consultants, mine representatives.

I would like to think that there would be a representative from a responsible public interest group, which would be Great Basin Research Watch and somebody like me, and appropriate independent experts like a person from the U.S. Geological Survey or consultant who is familiar with these concepts, but not employed in -- maybe their primary income isn't from the mining industry.

CAVANAUGHBILL: And do you know if the agency has anyone on their staff currently that would have this kind of technical background?

KEMPTON: I know they have technical -- they've always had technical people on staff that are -- understand water quality and geochemistry. But these kind of errors seem to be ongoing in these modeling reports. The fact that there is a trail of these model predictions that have systematically underestimated by a lot, the level of pollution in the mine lakes, suggests that there needs to be some fresh eyes, I would say, into this to review it. I would give an example, if that's appropriate?

CAVANAUGHBILL: Sure.

KEMPTON: Okay. So I had the good fortune to work on the PolyMet project in the state of Minnesota from about 2008 until 2015. A proposed mine and the state of Minnesota has a bunch of very good geochemists on their staff. The proponent, PolyMet Mining, they brought in very good consultants, SRK, as one of their consultants.

Bar -- good engineers, Bar Engineering, and then the State of Minnesota said whenever they bumped into something they weren't clear about, they said we need to bring other people in. It wasn't a huge effort, but one of them -- I was one of the geochemists that was involved in that.

There was a geo-statistician. There was a regular statistician. There was an expert in these models that are used for propagating uncertainty, probabilistic models, just to review the work by the proponent of the mine. And we all got together in a room, and it didn't take that long, it took a few days, to go over conceptually how all these kind of calculations can be done and the models that were going to be implemented.

And came up with ranges, reasonable ranges for the parameters and the product was a probabilistic simulation, being that propagated the uncertainty in the model parameters through to the estimates in water quality at the end. And those were used to then estimate the costs for managing the water when that mine went into production.

As far as I know, it has not begun production yet. But that seemed like the way to do it. It wasn't indiscriminate funding of a bunch of experts here and there. It was bringing in targeted individuals and getting people to agree conceptually on how the water was going to be done.

CAVANAUGHBILL: And you think that could work in this instance?

KEMPTON: I think that should be done in -- yeah, all the projects that I've reviewed for at least mine water in the state of Nevada in the last three or four years, I think it should happen in all of them because rather than having all this work done and all these reports done, and then we read these huge reports and I don't understand where it gets to be critical about how these calculations are done.

And then we put these long and often very boring sets of comments out and then it doesn't always field a product. I think it's more effective to have people sit in a room and agree and explain to one and another how they understand this conceptual model to be operating. And once you've got that understanding, then you can turn that into a computational model.

And these don't need to be very complicated. People make them very complicated, but it's my opinion that they -- personal opinion that they don't need to be very complicated. In part, because the uncertainties are large. That rather than honing on a more complicated model, better to step back, have a simpler calculation model, and accept larger error bars on the estimate.

CAVANAUGHBILL: Okay. So this is different than when Dr. Miller was testifying, the model he was looking at for the -- the Rind Model that they used for the pit lake. The modeling you're talking about where we're trying to estimate the pollutants coming in, those can be adjusted, you're saying, with looking at testing times and --

KEMPTON: Yes. I'm still talking about this concept that is the Rind Model is a term or the idea that you blast to excavate the pit and so you leave this damaged rock zone in the perimeter of the pit and that's where most of the reactivity is for the -- that's where the -- that's the source of most of the pollutants and where most of the oxidation reactions happen (indiscernible).

CAVANAUGHBILL: Okay.

KEMPTON: (Indiscernible) in the mine.

CAVANAUGHBILL: You had mentioned briefly another concern. I believe you mentioned the acid generator waste rock facility?

KEMPTON: Yes.

CAVANAUGHBILL: Okay.

KEMPTON: So it doesn't look to me like the acid generating -- potential acid-generating facility they call it. PAG. It doesn't look to me like that that is going to be effective at capturing water that comes out of that facility. And here's the reason why. There's a plan to close it with a two-foot vegetative cover. That seems fine.

And the Mount Hope area gets something like 14.8 or 9 inches of rain per year. And they estimate that most of that'll be captured and evaporated off by the cover. And they estimate that 0.37 inches per year, on average, of water will percolate down into the acid-generating waste rock facility. .37.

And then at the bottom of that facility, the way I read the reports is that there is a layer -- compacted engineered layer, and it has hydraulic connectivity of 124 inches per year. And so if you have .37 inches of water per year moving down, and you have a layer that's supposed to stop it but it has a connectivity of 124, inches per year, the water's just going to percolate right on down through that layer.

CAVANAUGHBILL: And I'm going to have you look at Exhibit 12. You're saying report, are you talking about the waste rock management plans?

KEMPTON: I've got letters -- exhibits are letters.

CAVANAUGHBILL: We have both.

NUBEL: It's in our exhibits. NDEP's exhibits.

CAVANAUGHBILL: Yeah.

GANS: It's this one right here.

CAVANAUGHBILL: There's two sets of them, I think. You're talking about the report. So the numbers that you're throwing out are coming from the reports that were submitted during the permit application process?
KEMPTON: I did not look at the 2012 revised Mount Hope waste rock management plan before today. I had been looking at the 2010 report.
CAVANAUGHBILL: Or 2009 you mean?
KEMPTON: Sorry, 2009 report.
CAVANAUGHBILL: So there was an original 2009. That was what you were looking at, the numbers that you were drawing?
KEMPTON: Yes.
CAVANAUGHBILL: And the concerns that you had that you raised in the comments in Great Basin Resource Watch?
KEMPTON: Yes. But in looking at this --
CAVANAUGHBILL: I was going to ask. You have had a chance to look at this revised Mount Hope waste rock --
KEMPTON: Yes.
CAVANAUGHBILL: Okay.
KEMPTON: Yes. And in looking at this, I didn't see where there was anything different, at least relative to the parts of the study that I was concerned about.
CAVANAUGHBILL: And can you point those out to us?
KEMPTON: Yeah. I'm going to point it out right now.
CAVANAUGHBILL: So you still have the same concerns about those

barriers not being able to capture all that water?

KEMPTON: Yeah. So the liner that's supposed to be under the waste rock facility, to me, doesn't look like it's going to do anything to alter the amount of water moving down to the bedrock, to the water table below.

CAVANAUGHBILL: Which are you looking at a figure?

KEMPTON: Yeah.

CAVANAUGHBILL: Would that be figure 5?

KEMPTON: It looks like figure B.

CAVANAUGHBILL: It's to the left of B and it says drawing number.

KEMPTON: Figure 7. Sorry.

CAVANAUGHBILL: Figure 7.

KEMPTON: (Indiscernible). Thank you. Figure 7. So page -- it's right before page 34.

NUBEL: We included Bates numbers at the bottom right corner. Would you mind identify which --

CAVANAUGHBILL: Oh, I think it's 499. Can you see the little --

KEMPTON: I can't see those. Yeah, my eyes are not great.

CAVANAUGHBILL: May I approach the witness?

KEMPTON: 498 and 499.

KEMPTON: Okay.

CAVANAUGHBILL: Mr. Chairman, may I approach the witness so I can --

GANS: Pardon?

CAVANAUGHBILL: May I approach the witness to show him the Bates number?

GANS: Yes, you may.

CAVANAUGHBILL: It's kind of faint.

KEMPTON: I see it. No, 00498 and 00499.

CAVANAUGHBILL: Okay. Thank you.

KEMPTON: I see those okay. So yeah, post reclamation waste rock facility cross section 00499 it precedes page 34. And on the PAG waste rock facility on the left, you have the channel, there's a ground surface, a five-foot basal layer of NAG, which means not acid-generating foundation, drains, appropriated piping. So they have pipes on the bottom of here, six-inch diameter perforated to capture water. And then there's a 12 inch compacted low permeability base layer.

One times ten to the minus five, that means one times ten to the minus five centimeters per second, which means the same as 124 inches per year. So my contention is that that layer that could have the hydraulic connectivity of 124 inches per year will not stop water percolating at .37 inches. So that's one place where I think that this looks like it wouldn't work.

And in the bedrock in the area, just looking at the 2010 groundwater modeling, I think it's Montgomery Associates before it, but there are hydraulic -- or there are recharge values for the area where the waste rock facility would go. And the recharge in that area, estimated in the groundwater model is between 1.7 and 2.7 inches per year.

So you know, three or four -- four to seven times higher than the amount of water that they're predicting coming out of the waste rock. So the bedrock has enough connectivity to transmit the water that'll pass through the waste rock. And the layer of compacted low-permeability base will have also enough connectivity to transmit the water that'll seep down through the bottom of the rock.

So to me, I can't understand why this waste rock facility, which will, as designed, be all full of acid-generating waste, which they've determined will, in exposure to oxygen and water will produce acidic drainage and then percolate on down (indiscernible) water table and all through everywhere it would go from there.

CAVANAUGHBILL: And this was raised in the comments to the agency during the permitting process?

KEMPTON: Yes.

CAVANAUGHBILL: And do you remember what their response was?

KEMPTON: No. I mean, it wasn't -- it just said this looks like it's an acceptable design. Let's see. Back to Exhibit H. That's the standard number. This ten to the minus five centimeters per second compacted layer is a standard Nevada requirement

for liners beneath mine waste. Sorry to keep everybody.
CAVANAUGHBILL: And the -- you were kind of talking fast for laypeople like myself, but the 2.6 times 10 minus 3 centimeters per day get to the 3.7 inches per year that you'll be using?
KEMPTON: So --
CAVANAUGHBILL: Where'd you get that information from? From their report?
KEMPTON: Yes, from the --
CAVANAUGHBILL: Okay.
KEMPTON: -- it's on the figure, for example, that we just talked here in the Exhibit 12, 00499. If you just look at that diagram, it shows the layer. And I try not to jump around in different units in metric and English. So to me, the units that are relevant are the estimate of net infiltration, that is the amount of water that'll percolate annual below the root zone into the acid generating waste rock facility.
CAVANAUGHBILL: And where is that on this figure?
KEMPTON: That's not in this figure.
CAVANAUGHBILL: Okay. Take a look at page 38 of that same document. We're in document 12. Middle of the top paragraph.
KEMPTON: Yeah. Okay. So should I read this? Is that right?
CAVANAUGHBILL: No, but is that where you're getting these

numbers?

KEMPTON: Yeah. Right.

CAVANAUGHBILL: Okay.

KEMPTON: Yeah. So in trying to make this easier for hearing. So the units, they talk about 2.5 percent of precipitation. So 2.5 percent of the annual precipitation of 14 -- I think 14.8 or 14.9 inches, that's right around .37 inches per year. So that's where I got it. It doesn't appear in this paragraph in those units.

CAVANAUGHBILL: Okay.

KEMPTON: But so just to have everything in units, the water flux estimated .37. The connectivity of the base, 124 inches per year. Flux 1 -- 0.37 inches per year. The base connectivity 124, and then the bedrock underneath it, between 1.7 and 2.7 inches per year. So all of the translucidity (phonetic), the connectivity below the facility, is way higher than the amount of water they're expecting to come down.

And I would just point out the water in these acid generating waste rock facilities, very, very concentrated over time. This stuff can easily 100,000, 200,000 parts per million, 10, 20 percent solids in an acid generated waste rock facility. So even though it's a small amount of water, the amount of mass moving down turned to pollutants can be higher than we'd like them.

CAVANAUGHBILL: And after reviewing this, and just based on your knowledge, how long before you think there might be some leakage or draining?

KEMPTON: Oh, it could be hundreds of years. Yeah. So the facilities that I see can be 600 feet deep, just to pick one number out of the range. And .37 inches of water percolating down, that might move, because it's spreading out through the pores, it might move maybe four or five inches a year.

So how long for four or five inches of water to move 500 or 600 feet of rock, hundreds of years. So it's a long-term perpetual situation where that'll be seen again.

CAVANAUGHBILL: Okay. So do you believe that -- I mean, was it pointed out in your comments that their analysis was -- had this potential damage or this potential outcome?

KEMPTON: Well, it points out that the ten to the minus five, this 124 inch per year connectivity layer won't stop the water from the acid-generating rock. I definitely point that out. Yeah.

CAVANAUGHBILL: And is it your opinion that this needed to be reconfigured in order to better protect against leakage?

KEMPTON: Well, the plan, as I understand it, is to capture the water and then divert it to an evaporation basin. The cumulative amount of flow from that generating waste rock was around 12 gallons a minute. I think that's the estimate, the long-term flow. So diverting that to an evaporation basin, that seemed fine as a long-term remedy. It's not totally passive, but that's a pretty easy thing to do in Nevada to just get rid of the water like that. My concern is that it doesn't look like it would actually be diverted out to be captured.

CAVANAUGHBILL: And why is that?

KEMPTON: Because it would just move on through the basal layer underneath the waste rock facility. There's -- they do have pipes under there, perforated pipes, and the idea being that those would capture the water that's percolating down. But one, any of the water moving between those pipes is just going to move on down.

And my understanding of unsaturated flow, this is, you know, kind of a detailed thing, but it's not going to flow out into an opening like that. It'll flow around an opening rather than flow into.

CAVANAUGHBILL: So it will still get out?

KEMPTON: So it will go down. It won't turn out -- it won't be captured in their pipes system that's supposed to then divert the water. It will rather flow down into the underlying bedrock and

into the water table flow.
CAVANAUGHBILL: Okay. And did you find what the agency's response was to this concern?
KEMPTON: Oh, I'd have to look at this.
CAVANAUGHBILL: And this is Exhibit H.
KEMPTON: Yeah. Back there. Response 13 it just says that the acid generating waste rock will remain above the one-foot thick engineered subgrade. And then it flows to a 160 mil high-density polyethylene liner. Once on the liner -- so that's good. So the idea is once it's captured, it goes onto a liner to a collection channel and into collection pond. So HTPE high-density polyethylene, so those are, essentially, impermeable layers.
So now, if somehow the design includes an impermeable layer underneath the acid-generating waste rock facility, great. I've not seen that. But if that's what they're doing, then that would capture the water, aside from whatever small amount would leak through a liner like that and be captured, perpetually, into an evaporation basin.
CAVANAUGHBILL: But that's not what the reports -- the plans --
KEMPTON: I don't see that in the report.
CAVANAUGHBILL: Okay.
KEMPTON: And I don't see that in the response from the agency, Division response 13.
CAVANAUGHBILL: But that would be a fix for it?

KEMPTON: That would be a fix, right. You could line it like that. You can put a cover on it that doesn't let oxygen through. You can put a cover that doesn't let water through. You can design them in ways that make impermeable layers. And I mean, people think about this stuff, but it's the grand problem of acid generating mine waste is what do you do with 450 million tons of acid-generating rock so that it's not a perpetual source of pollution, and it's hard to find an answer to that.

CAVANAUGHBILL: Thank you. Let me look at my notes real quick. That's all I have for now, at this time.

GANS: Okay. Dan?

NUBEL: Sure. So Mr. Kempton, you said that you were a consultant?

KEMPTON: Yes.

NUBEL: And are you still?

KEMPTON: I could be, but I don't have any consulting jobs right now. I have an LLC that I operate, but right now the only job in this capacity is the on staff geochemist for Great Basin Research Watch.

NUBEL: Okay. And were you here for Mr. Miller's testimony?

KEMPTON: Yes.

NUBEL: Did you hear him say that all consultants were biased to a degree?

CAVANAUGHBILL: I believe he said there was an implied bias in the industry, or something like that.

KEMPTON: Something like that.

NUBEL: Did you find that statement inflammatory?

KEMPTON: No.

NUBEL: Were you biased in the consulting work that you did?

KEMPTON: Well, there's pressure always to come up with an answer that is favorable to your client. What happens is that if you do a study and then it's not what the client needs to see, often, they just ask you to submit that to their attorneys and then it doesn't see the light of day. So I've had a few projects like that before or after I reach any conclusions where the operators didn't like the results for whatever reason. And they said, please just send it to the attorneys so it doesn't see the light of day.

NUBEL: But was your work itself biased?

KEMPTON: No, I wouldn't say my work is biased. I work very hard not to have biased work. Yeah.

NUBEL: Are you familiar with Andrew Nicholson (phonetic)?

KEMPTON: Yes.

NUBEL: And could you tell me who he is and how you know him?

KEMPTON: Andrew Nicholson is a geochemist. He has a PhD from the School of Mines. He was hired by PTI Environmental Services probably around, boy, I'm going to say 1990. I'm going to have to sort of guess on that year, '91. And I worked with him for several years as a consultant together with Dr. Nicholson.

NUBEL: So you worked with Mr. Nicholson?

KEMPTON: Uh-huh. Yeah. Yeah. And I see him in the grocery store and I saw him at a play a few months ago. I see him around town. I haven't worked professionally with him in many years, but.

NUBEL: Are you aware that he reviewed the Mount Hope geochemistry report?

KEMPTON: Yes. I saw his comments in the front.

NUBEL: And are you aware that he approved of the methods that were utilized?

KEMPTON: I saw that he seemed okay. I saw he made some comments, and I saw that they were responsive. I don't know if he felt like those responses were satisfactory or not. I haven't talked to him about this project, so.

NUBEL: And in your experience with him, is he scientifically qualified to look at that type of report?

KEMPTON: Yes.

NUBEL: And you said that you didn't review the 2012 revised plan?

KEMPTON: That's right. Although, I have it here, and before coming into the hearing today, I looked very quickly at the figures to see if there was anything different about the liner underneath the acid-generating waste rock facility. And nothing in this figure looks different than what I've seen before.

NUBEL: Do you think that it is possible that there could be updated information in that report that would change any of your conclusions that you offered today?

KEMPTON: It's possible, but I would be surprised if they didn't put it in that figure. If they have a different liner, I can't imagine why you wouldn't put it in the engineering figure that shows what the facility's going to look like when it's done.

NUBEL: How long was your review of the 2012 report today?

KEMPTON: Two minutes.

NUBEL: And how many pages are in it?

KEMPTON: Forty-six.

NUBEL: Do you feel that you adequately prepared to discuss the 2012 report?

KEMPTON: No. Except that I looked at the figure where critical information should reside about how it's going to be designed. But that's right, I have not read, and I wouldn't be qualified to comment on the testing and so forth.

NUBEL: Okay. Thank you. That's all the questions I have.

CAVANAUGHBILL: Mr. Kempton, in your experience, we were just talking about that Exhibit 12, the figures, do they represent everything that's contained in the text in terms of the plan for the project?

KEMPTON: Well, I don't know because --

CAVANAUGHBILL: But I mean, normally, wouldn't they?

KEMPTON: Normally, they would show you conceptually in an engineering diagram, that's what these are, so you can get an idea about what the closure of the facilities are going to look like. What kind of cover, slopes, layer, spacing, that kind of thing. It's the basis, I would assume, based on other reports, this is the kind of diagram is the basis for quantitative modeling where you look at how much water flows through there in a time period.

CAVANAUGHBILL: And here you can see on their figure there you mentioned the 12-inch compacted low-permeability base layer.

KEMPTON: Yes.

CAVANAUGHBILL: So that -- and this is the 2012, so that appears to still be their plan?

KEMPTON: I mean, that looks like (indiscernible).

CAVANAUGHBILL: And if you turn to page 34, the next page, that first paragraph?

KEMPTON: Yeah.

CAVANAUGHBILL: It states, "In addition, the PAG WRDF is designed with a low-permeable base layer in order to minimize potential for downward migration of (indiscernible)"? So is that still insufficient as you said before?

KEMPTON: Yes. It's insufficient. A 12-inch thick engineered subgrade, one times ten to the minus five centimeters per second, which I have been referring to that as 124 inches per year hydraulic connectivity, and a five-foot thick non-acid generating base layer. Yeah. I would say that's inadequate.

CAVANAUGHBILL: Okay. But you had read earlier from the agency's response said that they were going to put in the 60 mil high-density polyethylene liner?

KEMPTON: That's -- my read of that is that that is in the channels once they've captured the water that seeps out the bottom. That's not proposed for underneath the entire waste rock facility.

CAVANAUGHBILL: And that's what you're saying is necessary?

KEMPTON: Or -- right. And you can say we're not going to capture it and it's going to go down and it's going to flow perpetually into the pit lake because that's where it's going to go. That would be -- it just doesn't say accurately where the water's going to go. But to say this low -- this proposed liner that I'm seeing here in the 2012 waste rock -- update waste rock management plan, as I read it on page 34, I don't see why that would stop water from percolating down to the water table below.

CAVANAUGHBILL: Okay. So it still doesn't address the concern?

KEMPTON: It doesn't address the concern that I had coming in. If there's something else I don't know based on what else is in the report, great. But as it is here --

CAVANAUGHBILL: Okay.

KEMPTON: -- yeah.

CAVANAUGHBILL: Thank you. If I could take a minute just to look at my notes. Just a couple more things. Have you formed an opinion on how the predicted water in the Mount Hope pit lake would compare to what you would expect based on other mines you have looked at?

KEMPTON: Not in detail. As part of our comments, we just made a very rough estimate of the predicted sulfate concentration. I just looked at 50 years, but the predicted sulfate in the 2010 Schlumberger report on the water quality of the mine pit had 155 milligrams per liter of sulfate.

And so we just did a simple calculation saying, well, here's how much acid-generating wall rock is around the pit, which is about 16 percent of the wall rock. That's above where the -- based on the analysis right now, if acid-generating rock is above there, the lake's going to reach. But that still would be flushed out into the lake by, you know, rain and snow melt over time.

And so just a rough calculation and pulling some numbers out of other reports that have been approved in the state of Nevada about how fast these reactions occur in wall rock, we made an estimate. I think it was 855 milligrams per liter of sulfate. So the Schlumberger model has 155 and our rough cut, very rough cut estimate was about 850.

I would say, also, that's -- we look at 16 percent of the wall rock that was acid-generating. Based on my read of the waste rock, almost all the rock around the pit had contained sulfide. The average range is between .29 and 3.91 percent sulfur in the wall rock. Those are averages on all these different rock types that are going to be exposed on the pit. And that's plenty. That's plenty of sulfur.

So all that pit, all the walls, to a first approximation, are going to be reacting, oxidizing, and bleeding sulfate and other (indiscernible) into the pit. It may not be acid if the rock isn't acid-generating, but it would still be a lot of constituents into the lake.

CAVANAUGHBILL: Okay. And so was this another one of your concerns?

KEMPTON: Yeah. Well, it's another -- it's the same concern because their estimate of water quality in the mine lake, which I just picked year 50 at 155 milligrams per liter, all that's based on this assumption of the pollution coming out of the wall rock based on one week of a laboratory test. The amount released by one week.

CAVANAUGHBILL: And that was what you pointed out earlier as being the large and systematic error?

KEMPTON: I think it's a large error. That's right. And I think it's systematic because assuming the pollution coming out is based on one week of a laboratory test, (indiscernible) always less than 1, 5, 10, 200 years under field conditions.

I mean, I could give it a quick example. I don't know if this is a good time, but it's just another mine, but it compares these laboratory tests to field conditions. It takes like a minute. But I won't do it if it's off point.

CAVANAUGHBILL: That's up to the chairman.

GANS: That's up to you if you want it on the record.

CAVANAUGHBILL: Go ahead. Sure.

KEMPTON: So these laboratory tests we speak about, the humidity cells, about ten percent of the samples at the Mount Hope mine were what I would consider very reactive. They had 1,000 milligrams per liter of sulfate in the effluent. Every week, a thousand milligrams per liter. About ten percent of the samples.

That's very similar to what is at the

Phoenix project in -- near Ballow (phonetic) Mountain, Nevada. About ten percent of those rocks have this about 1,000 milligrams per liter sulfate coming out. But the water that came out of those rocks, 1998 there was a big el Niño year, and many times more water rained into Ballow Mountain, and the water that came out of the rocks wasn't 1,000 milligrams per liter, it was 100,000 milligrams per liter of sulfate. It was 100 times higher.

So it just is an illustration that you would not, under any conditions, I wouldn't think, take what the actual concentration that you see in a laboratory test, these kinetic tests, which are entirely arbitrary in water and rock and duration and apply them to the field.

And so there's an example of another mine with kind of similar rock in Nevada that had concentrations coming out of the rock a hundred times higher than the highest they saw in their humidity cell tests.

CAVANAUGHBILL: And it's your belief that the agency could go back and get better figures, more accurate figures --

KEMPTON: I think they could be calculated --

CAVANAUGHBILL: -- to correct this error?

KEMPTON: Yeah. I think they could recalculate, somebody could recalculate the water quality in this mine lake and come up with a more reliable value. It might have a big range, but it would certainly be a more reliable estimate than what they have now.

There's a lot of uncertainty. And I know the SEC here brought that up and is it even worth doing any more analysis given the huge uncertainty, but there are boundaries on the parameters. There's -- the amount of -- the thickness of this reaction zone in a wall rock, it isn't infinite. It might be five feet. It might be 50 feet. There's some measurement for that kind of thing. But there's boundaries on that.

And Dr. Miller had spoken about the fact that when you draw the water table down, pulling oxygen into wall rock, pumped in, if infection is pulled in. Again, you know how much water you're pulling out. You know how far out. That's a quantifiably parameter. And certainly, I have worked on and I have seen other projects where people put that -- an estimate for that very number into their estimates for the water quality.

So the ranges might be big if you accounted for all that. Like factors of ten or more in the estimates of future water quality, but it's doable.

CAVANAUGHBILL: Okay. I don't have anything further at this time.

GANS: Yeah.

NUBEL: So the comment letter, you were discussing the calculation that went into it. There was a long calculation where you input certain numbers and figures, right?

KEMPTON: Yes.

NUBEL: And you described that as a very rough cut estimate?

KEMPTON: Yes.

NUBEL: Why did you describe it as a very rough cut estimate?

KEMPTON: Because I wanted to keep a very simple illustration. I didn't want to spend a lot of time on it, but I wanted to make it so that it could be understood quickly by reviewers at the NDEP and the mines consultants. And really a lay audience, ideally. For a person with kind of, you know, high school chemistry kind of level.

So I wanted to keep it simple and illustrate that using lower estimates of what could be going into the lake, it ought to be a lot higher than what the current model predictions are.

NUBEL: And many of the estimates that you put in were derived from other pit lakes that you have studied?

KEMPTON: I just found reports and pulled numbers out of reports. So the number tends to be -- that I used was how fast is oxygen producing pollution in wall rock. And the units I pulled were in kilograms of sulfate per square meter per year. And I think I used the number one kilogram for a sulfate per square meter per year coming out of wall rock.

There's a -- I just -- I've compiled some of those in some papers in the past, and there's pretty big ranges for how fast those reactions are. And I mentioned earlier, I've done some measurements, figured a way to measure this oxidation rate in pit benches; too small to be really widely applied, but it's in that range, between, like, .5 and 8.

NUBEL: So there's no agreed-upon numbers for you to input?

KEMPTON: No.

NUBEL: You just came up with it from various sources?

KEMPTON: I'll pulled from the low range of what models have used, what I've measured, and what I've seen in other stuff.

NUBEL: Okay. That's all the -- could I have one second, please?

GANS: Sure.

NUBEL: And was your analysis -- sorry. Was your analysis within the comment letter peer-reviewed?

KEMPTON: No.

NUBEL: So no other experts that you know of have reviewed this?

KEMPTON: That's right.

NUBEL: Or verified that the contents of it are scientifically approved?

KEMPTON: That's right.

NUBEL: Okay. Thank you.

GANS: Okay. It's panel's turn. Kathryn, do you have anything you want to --

LANDRETH: I don't have anything.

GANS: -- ask?

Tom?

PORTA: Yes. Question, you brought up an underestimation of oxidation rate that was grossly underestimated, and then you mentioned an El Niño year with -- you know, moisture that was in excess of what was planned or modelled for. And I don't recall the specific mine, but --

LANDRETH: Phoenix.

PORTA: Phoenix? Okay. To date, do you know of any tests that anyone does that can replicate that type of scenario that could be used in modeling?

KEMPTON: So I would clarify, on the -- in discussing the Phoenix Project, I was just making the point that there are these laboratory kinetic tests --

PORTA: Uh-huh.

KEMPTON: -- these humidity cell tests which produced about 1,000 milligrams --

PORTA: Right.

KEMPTON: -- per year of sulfur, and then under the field condition in the rock, they got, like, 100 times higher --

PORTA: Yeah.

KEMPTON: -- than that.

PORTA: Right.

KEMPTON: But to my knowledge, nobody tried to predict what the seepage was going to be in that project -- in the Phoenix Project. I just happened to -- I bring it up because it just illustrates that these laboratory tests are not at all -- cannot be at all directly applied to concentrations that you're going to see under field conditions.

PORTA: Yeah.

KEMPTON: You have to think a little bit more about it than that.

PORTA: Right. But so there's no -- this test don't (sic) necessarily reflect field conditions, and there's nothing out there to date that we know of, a test that could be done to try to replicate a more realistic field condition to get a better estimate of the rate of the rate of reaction?

KEMPTON: I mean, a lot of these kind of people are very empirical, so there's a ton of piles of rock on lined layers, and people just look over years what comes out of those facilities. So yeah, those -- there's those kind of tests that you can do to measure what happens in the field condition. And I mean, there's a lot of tricks for converting from a little laboratory test to field --

PORTA: Yeah.

KEMPTON: -- conditions. I got a paper. But it's just a literature review, but a lot of people have thought about that based on scaling from the lab to field.

PORTA: And just one last question. So the humidity cell test, don't they try to predict, like, the fastest rate possible under, I guess, unusual conditions? They try to accelerate the rate, right, to get the highest number rate transfer?

KEMPTON: That's -- that's --

PORTA: And then that used -- is used and then plugged into the model to estimate?

KEMPTON: That -- that's right. The conditions are moist enough to sustain oxidation, and then they make sure that air is -- and oxygen is atmospheric and the temperature is right at room temperature. So -- and the rocks are less than a quarter of an inch. So small material, warm, oxygenated. So yes. So you have to think about all that if you're going to take that number and convert it to what might happen under field conditions. People do it all the time.

PORTA: Yeah.

KEMPTON: Even scale from that, and it's doable.

PORTA: Okay.

KEMPTON: Yeah.

PORTA: That's all I --

GANS: You used a different term than I've been hearing this morning from the Appellant. That -- what I've been hearing is that the Appellant believes that we really need another expert to look at this and maybe give us more information, which we've kicked around already. You said we need to recalculate. Is that the same thing?

KEMPTON: My focus group of one opinion is that this should be recalculated under more reasonable assumptions. And I think the best way to do that would be to convene an independent expert, representatives from the mine and their consultant, and an expert from NDEP, and just make sure everybody agrees in a room about what -- how -- how the calculations are to be done. I can't imagine sitting with people in a room, the NDEP people and the Schlumberger people that did the model and me and another geochemist or two -- I can't think we would all agree this was the best way to do it. I -- I -- I think in having to explain it, we would get to a better, more reasonable approach.

GANS: So your -- your approach -- again, I'm not putting words in your mouth -- is a little different than what I've heard this morning. You want to get a group of people together, how many, and then sit down and discuss this and then recalculate it.

KEMPTON: That's what I think ought to happen. I think it's a -- it's a refereed situation, right? So I -- I've been reading and hearing about referees. So the NBA has a $15 million facility that just looks over all the calls and just review the calls. And it isn't because the referees are bad or biased; it's that they're trying to get the right answer. So there's a lot kind of kicked around these days about referees -- Standard & Poor's and Moody's, you know, failure with the 2008 collapse. It's -- I just think this would be better -- I'd love it if the next time one of these comes up, the NDEP said fly out. I'll fly out and meet with them and meet with their consultants and talk and sit in a room and draw on a whiteboard and make sure we all understand. It's what we've done on the PolyMet project. It took a little time, but it sure would have been more efficient to have done that in the first place than to have a big report done without a diverse set of perspectives reviewing it.

PORTA: And just one last follow up. So then, if this process was followed, there would be much greater certainty in the pit lake water quality if that type of group was combined and discussed the modelling than what was performed here?

KEMPTON: There'd be much wider error bars. There'd be -- there'd be bigger, bigger error bars around the estimates than are presented right now. And they wouldn't -- I don't believe they would have that kind of conceptual errors or anything.

I don't -- I -- I mean, really, I -- I don't -- I just want it to be right. Like Glenn Miller said, you know, he's interested in public land. That's me. I'm interested in the public lands. But I don't have a desire for -- you know, an analysis to be incorrect or to get somebody. I'm just trying to make sure it's correct.

GANS: But -- but the insinuation is -- and I've heard now three times we've been together -- is that what we have on the table today is much lower than what Great Basin thinks it is, which would then change this project. If you -- if we do what you -- you're suggesting -- and it is higher. And I'm not saying it should or shouldn't be. I don't know. How would that change the project? What would the contractor or what would the permittee have to do? How would it change the water quality permit? What's the result of this?

KEMPTON: That happens all the time in my experience with mining projects, working for mine operators. It's when there's a prediction of an -- a less than ideal water quality or the PolyMet project I mentioned earlier in Minnesota, there's a lake, and they just said, we'll treat the lake. They'll deal with it. So they just came up with a cost estimate.

So I think if this lake were to be poor water quality or it failed the thresholds for not being adverse health risk to wildlife or humans or avian life, then you just treat it. Lone Tree mine fills up with acid water, and then they treat it, and now it's not, right? So it doesn't look unmanageable. One -- you can backfill it. I mean, there's things to do, but it's just a disclosure issue for me.

GANS: Okay.

KEMPTON: The money, that's not -- I've done --

GANS: Yeah.

KEMPTON: I've done -- I've done calculations of pit treatment, groundwater treatment; that's a little bit of my background, costing, that kind of stuff. But as a non -- you know, engineer, it's out of my field.

GANS: Tom?

PORTA: One last thing. And Division can correct me if I'm wrong here, but I think the current permit that's being appealed here only allows the company to mine down to the groundwater table, then followed by more testing to be done before they're allowed to proceed below the groundwater table; is that correct?

NUBEL: So the current permit, as soon as mining commences, they need to characterize the rocks and data over the next six-month period and then provide an entirely new, updated report for NDEP's review. And if at that point, it shows any changes or expected changes to the water quality, then there would be a modification to the permit.

PORTA: Okay. But they would not be allowed to go below the water table until these tests are done?

NUBEL: That's -- no, I don't believe that's correct. I think that was under -- you're thinking of the previous argument we had regarding Ritemoths (phonetic).

PORTA: Okay.

NUBEL: And that was the proposal that NDEP suggested to remedy this case --

PORTA: I see, okay.

NUBEL: -- in the middle approach.

PORTA: Okay.

NUBEL: But that is not what is contained within the permit.

PORTA: Okay, but there's -- they still have to conduct a series of tests as they're mining --

NUBEL: Yes.

PORTA: -- as they go, before they can continue. At some point, if the results show differently than what you've predicted, then the permit's going to have to be modified in some --

NUBEL: Absolutely.

PORTA: -- some fashion.

NUBEL: And if the results show that the pit lake would not comply with the NAC regulations, then there would either have to be a long-term funding mechanism in place to establish reclamation of the pit lake or mining wouldn't be able to go forward.

PORTA: Okay. And then, with that information, does that, to you, sound like a reasonable approach, given, again, this -- in my opinion, still a big cloud of uncertainty, no matter whose consultant --

KEMPTON: Yes.

PORTA: -- we're speaking to?

KEMPTON: Yes.

PORTA: It would?

KEMPTON: So -- so right. You know, I think you just plan for what you are -- anticipate. I mean, it's the same thing with moving rock or covering the rock. I think those are very precise or much more precise in terms of the closure bonds because people know very well how much rock they're going to have to move and how much it's going to cost to move it and spread it on the surface and whatnot. But you just put up a bond for that.

And so the lake, people treat water all the time. So I guess I would say you just plan on the bond for treatment of water. It doesn't -- I'm not a lawyer, right? So I -- I -- I don't want an objection coming over here, you know. But just saying it doesn't seem to me like different than -- you know.

PORTA: Right, but my question is the Division's approach that we just talked about, does that seem reasonable to you as we're going to continue this sampling and analysis?

KEMPTON: Yeah. Go --

PORTA: Okay.

KEMPTON: -- stop at the water table, and then beyond that --

PORTA: If --

KEMPTON: -- refine the analysis (indiscernible).

PORTA: Right, if it shows something different than what's been predicted.

CAVANAUGHBILL: I want it to be clear that that was a proposal, but that's not the permit currently.

LANDRETH: Right.

PORTA: Right. Not to mine below. I get -- I get that, but --

NUBEL: Mining -- within six months of mining commencing --

PORTA: Yes.

NUBEL: -- all of -- there needs to be new tests run and new reports --

PORTA: Yes.

NUBEL: -- generated --

PORTA: Right.

NUBEL: -- under NDEP's review.

PORTA: Right. And at that point, if there's something different, then the permit's going to be modified --

NUBEL: Absolutely.

PORTA: -- if it's reflecting something that doesn't show up in the initial sampling and analysis.

NUBEL: Yes.

PORTA: Okay. And I just asked this gentleman about that, and you thought that that was somewhat reasonable approach?

KEMPTON: Yeah, to stop and decide at the time you hit the water table with an updated lake water model finding.

PORTA: Well, I was talking about the Division's approach with the permit here. They're not saying, necessarily, stop, but I think if they find something different as we get into the pit and -- and the sampling and analysis is done, the permit's going to be modified, and -- which may or may not include who -- extracting below the groundwater table. We just don't know yet, until we get to that point, it seems like. And that's -- that's what I was trying to convey to you, is that -- does that seem reasonable that the permit, I guess, be modified if we find something's different once we start the excavation -- or the mining company starts the excavation?

KEMPTON: Sure. It seems reasonable --

PORTA: Okay.

KEMPTON: -- to me. I mean, my goal is to have a reasonable estimate of water quality and then cost associated with that.

PORTA: Okay.

LANDRETH: Mr. Chairman?

GANS: Uh-huh.

LANDRETH: I guess I'm a little confused, though. Does that change your position on the fact that you would like to see a relook at the calculations that have been done because of the errors that you've pointed out, to see that in advance of this -- the start of mining? Or are you saying that you think everything can be addressed after they start? Your concerns about the errors and their calculations, are you -- are you suggesting now that you don't think the -- there is a need now, before mining begins, to address the calculation errors by a third party?

KEMPTON: I think it looks bad for all of us -- my comment before -- to proceed with this in the record, where I -- what looks to me like a glaring error in how the calculations are done about water quality. And I understand there's an opportunity to refine the -- readdress the permit at the time it goes below the water table. But I guess to proceed with this, to me, doesn't look appropriate. But if -- if the mine says, oh, we're not making the pit lake at all, and then everything is redirected towards mining only to the water table, then the pit lake becomes a nonissue at that point.

GANS: I think -- do you have any further comments?

PORTA: No, I think I've confused everyone enough.

CAVANAUGHBILL: I have -- I have a --

KEMPTON: I'm missing the theme here.

GANS: Well, I want to just comment. The panel is asking your expert witness of his opinion, okay. I'm not sure it goes precisely along where you're going or precisely along where you're going, but you can believe that I will be asking more questions, as this hearing continues, along those lines. Okay?

And Tom, I appreciate you bringing it up.

PORTA: Okay.

GANS: Okay.

CAVANAUGHBILL: May I add to one follow-up question which I think might clarify? Because I think I understood where Commissioner Porta was -- where he was asking, I could see that -- where the witness wasn't -- there was a little disconnect there.

PORTA: Uh-huh.

GANS: Was it your interpretation or the witness's interpretation? I want to be careful that you're not leading the witness.

CAVANAUGHBILL: Oh, was it my -- no, I just think that -- if I could just ask a follow-up question, I think it might clarify.

GANS: Well, go ahead.

CAVANAUGHBILL: So Commissioner Porta asked you if you thought it was reasonable for the company and the agency to continue reassessing and sampling and all that as the mine proceeded. There was a little confusion, though, because there was an earlier proposal by the State that they would agree -- if we dropped this appeal, they would agree to stop the mining when it hit the water table and then reassess everything again. But the appeal was not dropped, so that proposal's off the table. So that's not in the permit.

KEMPTON: I see.

CAVANAUGHBILL: So Mr. -- or Commissioner Porta's question was more an existing permit, which calls for the continuing sampling and analysis and all that; was that reasonable? And so I think that was the question.

PORTA: Uh-huh.

CAVANAUGHBILL: And my question to you, based on that is, would that change -- if the analysis on the errors that you've pointed out or you're concerned about the acidic leaching -- or leaking, could that change the mine plan? If the mine starts now without addressing these, and then down the road in six months or whenever, they start to see some of these indications, would the mine plan potentially have changed or --

KEMPTON: I -- that's -- those are mining economic kind of topics. My really wild guess would be that there is no advantage to altering a mine plan based on the lake water quality, that the cost to actively treat a mine lake is very likely going to be less than the cost to really modify a pit design, given ore -- ore pricing and slopes, there's just so many things going on in -- in a mine plan, so -- but that's -- that's an unprofessional, you know -- that's out of my area.

But I -- I -- I guess, maybe I'm -- I'll -- I'll take another stab at answering, though, Commissioner Porta. But if I -- I guess I would say, I don't think it's a good idea to proceed with an error, with really big conceptual error in an estimate. I think I would -- think it would be better to --

GANS: But it is your opinion --
KEMPTON: My opinion --
PORTA: Uh-huh, uh-huh.
GANS: I'm quoting you. There is a big essential error.
KEMPTON: That is my opinion. And if people correct me, then I have misunderstood their report. But as I read it --
GANS: Okay. Dan?
NUBEL: Sure, yeah. If I could just ask a follow-up related to his question, thank you.
So Ms. Cavanaugh-Bill asked you if the mine plan could change based on the new reports and the new information, right?
KEMPTON: Okay, yes. That's right.
NUBEL: Okay. Have you read the permit in this case?
KEMPTON: No.
NUBEL: You haven't read the permit that is the issue for why we're here?
KEMPTON: I -- if I read it, I don't remember reading it. It was a -- it would have been a while ago.
NUBEL: So you really don't have any knowledge as to what NDEP's powers are to change the permit --
KEMPTON: That's right.
NUBEL: -- with the --
KEMPTON: I don't know that.
NUBEL: -- new information it finds?
KEMPTON: That's right. Yeah, I don't know that.
NUBEL: Okay. Thank you, that's it.

GANS: So I'd like to thank the witness.

Did you have something more, Kathryn? I'm sorry.

LANDRETH: No, thank you. No.

GANS: Oh, okay. I'd like to thank the witness, please. And I have a couple questions for the Appellant and State. It's time to break for lunch. So we need to find a -- determine how long we're going to be gone.

Number -- number two, I want to make sure what that -- your opinion is of the Appellant and the State about tomorrow. We've gone three and a half hours. We've gone through a couple witnesses, three witnesses, and I've been asked a question, are we going to be here tomorrow? And I need to know what your opinion is.

CAVANAUGHBILL: That was all of our witnesses, so we don't have any further witnesses.

GANS: Okay.

NUBEL: Right. So the witnesses would all be ours, and I would anticipate if we did a break for lunch for 30 minutes or so, we'd get back here by 1, and we could probably get through our case-in-chief by 3:30 or 4, I'm hopeful.

GANS: Okay. That makes sense. It makes -- that's reasonable?

CAVANAUGHBILL: Yes.

GANS: It depends on how long your -- if you're going to have 30-minute closing arguments or not.

CAVANAUGHBILL: I don't anticipate long close.

NUBEL: I don't, either, but I don't know.

CAVANAUGHBILL: I don't even mind submitting them in -- you know, written closing arguments if that's easier for the commission.

NUBEL: I'd prefer to get it decided today, unless you all think it would be very helpful to commit --

GANS: No, I think we're here, and we -- we are -- we will discuss this and make a determination, so yes.

Okay, so I have a suggestion for a 30-minute lunch. Is that satisfactory? Is it going to take longer? We're okay with 30 minutes?

CAVANAUGHBILL: Uh-huh.

GANS: Okay, we'll return here at 1:00.

CAVANAUGHBILL: Okay.

GANS: Thank you.

(Recess taken)

GANS: It's 1:08, so that's only eight minutes out. That's pretty good. So I applaud all your efforts to go down there and just get -- try to get something in your stomach.

So Dan, I think it's your turn.

NUBEL: Okay. And I will preface our testimony by noting that for the first time in these -- for the SEC hearings, we're incorporating a PowerPoint presentation. Most of what will be on the

PowerPoint is the exhibits, just a blown-up version of them so it's easier for you all, rather than having to flip through the exhibit binders, it's going to be up there. But if any of you can't see what's up there for whatever reason, I will be identifying which exhibit it is and which page number it is for the record. So I will just direct you to your binders --

GANS: Okay.

NUBEL: -- to see that.

GANS: And I wanted to make sure that our staff --

UN-ID'D: Yes?

GANS: -- hears this because I'll expect this at the regulatory hearings now, also.

UN-ID'D: Anything you want, Mr. Chairman.

GANS: Oh, God. That would be good.

NUBEL: Okay. NDEP would like to call its first witness to the stand, Matt Schulenberg.

Matt, you work for the Division of Environmental Protection, correct?

SCHULENBERG: Correct.

NUBEL: And what is your position within NDEP?

SCHULENBERG: So within NDEP, I am a regulation branch staff engineer.

NUBEL: And what are the responsibilities of that position?

SCHULENBERG: So I review mine permit applications, make sure they follow applicable regulations and protect the environment of the State.

NUBEL: Could you please describe your educational background to me?

SCHULENBERG: So I received my Bachelor's degree at University of Nevada, Reno, in environmental engineering. I'm currently pursuing my PE licensure. I need a little more time, but --

NUBEL: Okay, thank you. Do you have any professional experience reviewing and analyzing the environmental effects of mining operation?

SCHULENBERG: I do. I've been working with BMRR about three years, now. And over that course of time, I've become more versed in reviewing characterization reports and engineering designs, and --

GANS: Excuse me. BMR?

NUBEL: Sorry. That -- and BMRR is --

SCHULENBERG: Bureau of Mining Regulation and Reclamation.

GANS: Thank you.

NUBEL: Which is a branch of NDEP?

SCHULENBERG: Correct.

NUBEL: Matt, did you prepare a PowerPoint for today's testimony?

SCHULENBERG: I did.

NUBEL: And what is the purpose of that PowerPoint?

SCHULENBERG: To kind of more easily display why we think that the Mount Hope project meets all applicable regulations, and there's protected waters of the State.

NUBEL: Okay. So are you familiar with the proposed Mount Hope mining project?

SCHULENBERG: I am.

NUBEL: And how are you familiar with it?

SCHULENBERG: I was (indiscernible) project during the 2018 (indiscernible) period.

NUBEL: Could you please tell me what commodity Eureka Moly will be mining for?

SCHULENBERG: Primarily molybdenum, but other trace amounts of copper and coal may be recovered, and processed there as well.

NUBEL: Are you familiar with this map, which I will identify as NDEP 644?

SCHULENBERG: I am.

NUBEL: Could you please use this map to show us where the Mount Hope will be located?

SCHULENBERG: Sure. The Mount Hope project on this map is denoted by the red X, and it's in Eureka County, approximately 24 miles northwest of the town of Eureka.

NUBEL: And using this map, which I will identify as NDEP 678, could you please identify the general geography of the site?

SCHULENBERG: Sure. So the Mount Hope project will straddle the hydrogeologic divide of three separate hydrogeologic basins. That would be Kobeh Valley to the south and west of the pit -- or of the project, Pine Valley to the north, and Diamond

Valley, primarily to the east.

NUBEL: Thank you.

GANS: Excuse me. Can you give us an approximately size there?

SCHULENBERG: I guess if you use the pit, it's about a mile wide. You can got a -- get an idea of scale from the rest of that. Yeah, I apologize there's no scale there.

And then what the image on the right displays is just kind of a closer-up view of the main process components.

NUBEL: Okay. What is the expected project life?

SCHULENBERG: It'll be 44 years.

NUBEL: And when did NDEP first issue a permit to Eureka Moly for the mine?

SCHULENBERG: So NDEP issued the original permit in December of 2012.

NUBEL: And that process allowed for public comment?

SCHULENBERG: It did.

NUBEL: Did Great Basin Resource Watch comment on the 2012 permit?

SCHULENBERG: Great Basin Resource Watch did.

NUBEL: And could you please describe to me the steps that NDEP took to address Great Basin Resource Watch's concerns?

SCHULENBERG: Sure. So Great Basin Resource Watch had a number of concerns, but the -- the three primary concerns of the original 2012 permit were the adequacy of monitoring the well network, standard operating procedures in the event the well does go dry, and a divider berm between low-grade or stockpile on the PAG waste rock facility. Basically, what NDEP did was we added six new wells to the permit and also incorporated two new, additional wells that were previously proposed by Eureka Moly.

NUBEL: Did Great Basin Resource Watch appeal NDEP's issuance of the 2012 permit?

SCHULENBERG: They did not.

NUBEL: Did Eureka Moly apply to renew its 2012 permit?

SCHULENBERG: Yeah, in August of 2017.

NUBEL: Was Eureka Moly's renewal application similar to its previous application?

SCHULENBERG: Yes, it was identical.

NUBEL: And why was it the same?

SCHULENBERG: Because there had been no mine development and no additional information collected to upstate -- update studies and --

NUBEL: Do you have any expectation of when mining will start?

SCHULENBERG: Not at this point in time.

NUBEL: Did NDEP allow for public comment on Eureka Moly's 2017 renewal application?

SCHULENBERG: Yes, we did.

NUBEL: And did Great Basin Resource Watch provide comments on that renewal?

SCHULENBERG: Yes, they provided a 27-page comment letter.
NUBEL: Could you please describe to me the changes that NDEP made to the permit in response to Great Basin Resource Watch's comments?
SCHULENBERG: Sure. There's four primary changes that were made. One was the addition of an -- another well down a gradient of one of the waste rock disposal facilities. The incorporation of a SOC item for a revised waste rock managing plan --
NUBEL: Could you define SOC item for me?
SCHULENBERG: Oh, apologies. Yeah, a schedule of compliance item. It's an item in our permit that we think is necessary, but not needed for initial permit issuance. And --
NUBEL: Sorry to get you off track.
SCHULENBERG: Oh, no, you're -- you're totally fine. I think we also added a continued investigation as to the (indiscernible) damaged rock zone once mining commences, and also an investigation into the SPE7 (phonetic), spring seven conveyance pipeline system, which I'll go into a little bit later.
NUBEL: Is the public comment process generally helpful to NDEP?
SCHULENBERG: Yes.
NUBEL: And could you explain to me why?
SCHULENBERG: Yeah, it gives the public the opportunity to comment on projects, like Great Basin Resource Watch and other concerned citizens.

NUBEL: Did NDEP ultimately renew Eureka Moly's permit?
SCHULENBERG: We did.
NUBEL: Why?
SCHULENBERG: Because it met all applicable regulations.
NUBEL: In its comments regarding the Mount Hope permit renewal, Great Basin Resource Watch took issue with the characterization of the rock data around the site, correct?
SCHULENBERG: That's correct.
NUBEL: Can you tell me why it's important to characterize rock data around the site?
SCHULENBERG: It's important to characterize rock data around the site because it gives us an idea of the acid generation potential and also the potential for these materials to release metals and subsequently degrade water to the State.
NUBEL: So it's important to determine what rocks have the potential to generate acid and which do not?
SCHULENBERG: Yes.
NUBEL: Could you explain to me a little further why that distinction is important?
SCHULENBERG: Yeah. Well, generally, the acid-generating materials have a higher capacity to degrade water to the State than non-acid-generating materials.
NUBEL: And are you comfortable with me, from this point forward, referring to potentially acid-generating rock materials as a PAG?
SCHULENBERG: Yes.

NUBEL: Okay. And then nonpotentially acid generating would be nonPAG?

SCHULENBERG: Yeah.

NUBEL: Okay. What did NDEP review in determining the sufficiency of the rock characterization data?

SCHULENBERG: We reviewed the pit wall and waste rock geochemical characterization report.

NUBEL: Could you please explain to me the objective of this report?

SCHULENBERG: Yeah, basically to characterize materials that have been encountered during mining of Mt. Hood deposit.

NUBEL: And how did the report collect data?

SCHULENBERG: So the report collected data through borehole drilling that was utilized to delineate the deposit, then also an environmental characterization.

NUBEL: And did you find the amount of data gathered to be sufficient?

SCHULENBERG: Yes.

NUBEL: Are you familiar with this slide?

SCHULENBERG: I am.

NUBEL: And who created it?

SCHULENBERG: I did.

NUBEL: Could you please explain to me what it shows?

SCHULENBERG: Sure. I kind of just put this together as a -- a way to show how, from the initial characterization or initial field screening and

determination of chill types, how it progresses through testing to, ultimately, humidity cell testing that's used in modeling.
NUBEL: So this diagram shows the tests that were conducted on the material that was gathered?
SCHULENBERG: Yes.
NUBEL: So let's start with field screening and preliminary assessment, which is on the bottom here. Could you please explain that to me?
SCHULENBERG: Sure. So that's basically where you kind of get a general idea of the reactiveness of materials and kind of a general, overall metals content. And it kind of feeds into what the main material types of the facility will be.
NUBEL: And then, once you've done that, is that when you move forward to the static testing?
SCHULENBERG: Yeah.
NUBEL: And what does that entail?
SCHULENBERG: So static testing entails -- this is where we start digging into more the ability of the material to leach metals and then also acid generation potential. And that's done through Meteoric Water Mobility Procedures, acid-base accounting, net acid generation testing, and -- yeah.
NUBEL: Okay. And then from there, in some instances, there's humidity cell testing that's completed?
SCHULENBERG: Correct.

NUBEL: When is humidity cell testing done?
SCHULENBERG: Humidity cell testing is done if the materials will be present within the final pit shell to kind of get a release function for input into the pit lake model, or it will be -- they're also run for materials that kind of fall under the questionable category.
NUBEL: And could you briefly describe the process to me of humidity cell testing?
SCHULENBERG: Sure, yeah. So they get a -- a crushed rock sample, and they subject it to humidified air for three days, dry air for three days, and on the seventh day, they leach that material and analyze the leachate for chemistry parameters. And they do that over the first eight weeks, and then they kick it back down to every four weeks.
NUBEL: How many tests in total went into the report?
SCHULENBERG: About -- let me count real quick. About 4,000 analyses went into the test on about 1,800 different samples.
NUBEL: Okay. Are you familiar with this image, which I will identify as NDEP 633?
SCHULENBERG: Yes, I am.
NUBEL: And could you explain to me what it shows?
SCHULENBERG: Sure. So this kind of just gives a bleak view of the Mount Hope bed, and what it shows are basically the main alteration types of the pit that were determined, and then also the PAG

outlines.

NUBEL: So when I first saw this image, I thought it was a rock. But this is not a rock, correct? This is the actual shape that the pit is expected to be?

SCHULENBERG: Yes.

NUBEL: All right. And what do the --

GANS: Excuse me, again, Dan. Give me a perspective of size here.

NUBEL: I believe Mr. Schulenberg said it would be about a mile wide --

GANS: The pit itself is about a mile?

NUBEL: -- in diameter. Mile in diameter.

GANS: I'm sorry. Okay. I --

SCHULENBERG: And so each one's boreholes -- sorry, which I haven't gotten to, yet. They're about, I think, 150 meters apart for another sense of the scale.

NUBEL: So these boreholes were drilled all around the mine site?

SCHULENBERG: Correct.

NUBEL: Okay. And did this image identify which rocks had potential to be acid generating?

SCHULENBERG: Yes, it does. By the darker blue areas with the hashed lines -- sorry, too much coffee, there. Yeah, it delineates these potential PAG areas on the final pit wall.

NUBEL: And could you tell me what some of the other colors represent, as well?

SCHULENBERG: Yeah, so this one is a -- basically displays alteration. So you have potassics, loesig (phonetic), oronthel (phonetic), just to name a couple.

NUBEL: Okay. Did NDEP find that the report was sufficient in characterizing expected rock data in and around the mine?

SCHULENBERG: We did.

NUBEL: What did NDEP do with this information in the permitting process?

SCHULENBERG: So NDEP used this information to basically formulate containment requirements and also management enclosure strategies.

NUBEL: Will Eureka Moly be required to update its waste rock characterization report once mining commences?

SCHULENBERG: It will be.

NUBEL: And when will it be?

SCHULENBERG: Based off of the SOC item included with the permit renewal, there'll be a plan required six months after the initiation of a construction schedule, which kind of gets some information beforehand, and then, also every five years after that.

NUBEL: Okay. And what will this update include?

SCHULENBERG: So it'll include basically all newly collected information that's normally collected on a monthly sampling rate from Mount Hope project of mine materials.

NUBEL: Could you please tell me what waste rock is?

SCHULENBERG: So waste rock is basically rock that just doesn't have an economic molybdenum value.

NUBEL: So it's the rock that they don't need --

SCHULENBERG: Sure.

NUBEL: -- from the mine? How many tons of waste rock is the Mount Hope project expected to generate?

SCHULENBERG: 1.7 billion tons, approximately.

NUBEL: And what makes a waste rock potentially acid generating?

SCHULENBERG: So that's -- as I discussed in my testimony before, it can either be an acidic leachate noticed during the humidity cell testing, or it could be through acid-based accounting and the ratio of defertilization potential to acid generation potential.

NUBEL: How much of the waste rock for this project is expected to be PAG, acid generating?

SCHULENBERG: 450 million tons.

NUBEL: And do you know offhand what percentage that roughly equals out to of the waste rock?

SCHULENBERG: That's about 26.

NUBEL: Twenty-six percent?

GANS: Pardon me? Twenty-six?

NUBEL: Twenty-six percent of the 1.75 billion that you discussed?

SCHULENBERG: Correct.

NUBEL: Does Eureka Moly have a plan for determining which waste rock is PAG and which is nonPAG?
SCHULENBERG: They do.
NUBEL: And what is that plan?
SCHULENBERG: That's the waste rock management plan.
NUBEL: Could you tell me how the waste rock management plan makes that determination?
SCHULENBERG: Sure. So that'll be through a total sulfur analysis. And so through the characterization plan, they've determined that any material that has a total sulfur greater than 0.3 percent has the potential to generate acid, so that'll be routed accordingly. And anything with a total sulfur of less than that is considered nonacid generating.
NUBEL: Is NDEP satisfied with the plan for identifying PAG versus nonPAG waste rock?
SCHULENBERG: We are.
NUBEL: Does Eureka Moly's permit contain a plan for the disposal of the PAG material and the nonPAG material?
SCHULENBERG: Yes, it does.
NUBEL: And what is that plan?
SCHULENBERG: It's also the waste rock management plan.
NUBEL: Okay. Does the NAC, Nevada Administrative Code, have a minimum design criteria for the facilities that would be constructed to dispose of these waste rocks?

SCHULENBERG: For waste rock facilities, it does not.
NUBEL: And so what is the standard that NDEP uses for examining these facilities?
SCHULENBERG: So we utilize the additional authority granted to us by best engineering judgment. And I apologize. I can't remember the right name right now, the right number.
NUBEL: If I suggested to you that it was NAC 445A.432, would that refresh your memory?
SCHULENBERG: Yes.
NUBEL: Okay.
SCHULENBERG: Yeah, so that's best engineering judgment, where we can require less or more containment depending on the geochemical characteristics of the material.
NUBEL: And so just to be clear, the PAG waste rock is going to go to one facility, and then the nonPAG waste rock will go to a different facility?
SCHULENBERG: Correct.
NUBEL: So using this map, could you please -- which I will identify as NDEP 527, could you please identify the location of the PAG waste rock facility?
SCHULENBERG: Yeah. So basically, I'm going to also identify a couple of other things. But you've got the Mount Hope pit right here, and then you've got your PAG waste rock disposal facility to the north of the pit.

NUBEL: Okay. And then what about the nonPAG waste rock? Where does that go?

SCHULENBERG: So the nonPAG waste rock will be more of the west and the south pit.

NUBEL: Okay, and the nonPAG facility is much larger because there's more nonPAG waste rock --

SCHULENBERG: Correct

NUBEL: -- expected? Okay.

GANS: Pardon me. Just a moment. Those lines are like topo -- topo lines?

SCHULENBERG: Yeah, that's correct.

GANS: And what -- how -- what's the distance between them, or what is the elevation there --

SCHULENBERG: I think --

GANS: -- of those mountains? I mean, there are going to be hills or mountains of rock, right?

SCHULENBERG: Yeah, yeah. So the nonPAG facility will have a maximum height of about 900 feet above the natural topography. It's be 100-foot benches with I want to say about 200 feet of kickback.

GANS: Thank you.

SCHULENBERG: Yeah, of course.

NUBEL: Are there protections in place to ensure that the PAG waste rock facility does not result in harm to the environment?

SCHULENBERG: There is.

NUBEL: Are you familiar with these images, which I will note the one on the top is NDEP 528, and the one on the bottom is NDEP 529?

SCHULENBERG: I am.

NUBEL: And could you please tell me what they (indiscernible)?

SCHULENBERG: Sure. So this right here is the foundation of the PAG waste rock disposal facility. And just to kind of orientate us, this direction right here is north, to the left-hand side of the image. And then the Mount Hope pit is down here. And so basically what this image shows is over the entire foundation, there'll be a low-permeability soil layer with the one times ten minus five centimeter per second hydraulic conductivity requirement. And then in low-lying areas, there will be the placement of these foundation drains to collect any potential leachate. And these are displayed by these dashed lines here.

And then this kind of just gives a -- NDEP 529 just gives a general cross-section of what these foundation drains will look like. So you have your low-permeability soil layer, the five-foot nonbase (phonetic) placed on top of that, and then in those low-lying areas, you'll have the perforated collection pipes with the synthetic liner under there to minimize any seepage due to an increase in the hydraulic head.

NUBEL: Were you present for Mr. Kempton's testimony?

SCHULENBERG: Yes, I was.
NUBEL: And did you hear him talk about the PAG waste rock facility?
SCHULENBERG: Yes.
NUBEL: And his concerns?
SCHULENBERG: Uh-huh.
NUBEL: Do you have a response to those concerns?
SCHULENBERG: Yes, I do. So the flux that was mentioned in Houston's explanation -- or sorry, testimony -- there we go. So that was through the closure cover. And so basically, that flux isn't going to be the exact same through this entire waste rock disposal facility. That's going to be flowing unsaturatedly through preferential flow pass in the waste rock disposal facility itself. And then once it hits this low -- this area down here, which has a higher permeability than that flux, that'll basically hit this low-permeability soil layer and travel laterally towards these drains.
NUBEL: And there's a slope right --
SCHULENBERG: Yeah, the -- yeah, these are all in low-lying areas in the natural topography.
NUBEL: Okay, thank you. Did NDEP find that these protections represented best engineering judgment?
SCHULENBERG: Yes, we did.
NUBEL: Great Basin Resource Watch has expressed concern

that an expansion of the PAG waste rock facility would impact two nearby springs, given their proximity, right?

SCHULENBERG: That's correct.

NUBEL: Did you find it likely that those springs could be contaminated?

SCHULENBERG: I did not.

NUBEL: And why not?

SCHULENBERG: Because these springs are located -- and I'm going to try to do it with this figure here. So Spring SP4 (phonetic), which is one of the springs in concern, is located, give or take, right here. And then Spring SP3 (phonetic) is located down here. And while they are in somewhat close proximity -- they are about 350 feet north -- this whole facility's going to have engineered storm water conversion all the way around it. And then, on top of that also, from what I can tell, it doesn't appear that they are all cross-gradient from groundwater flow.

NUBEL: And so those springs are uphill? Is that right?

SCHULENBERG: Well, cross-gradient's more just across the hill, so --

NUBEL: Okay.

SCHULENBERG: -- it's actually -- yeah. A ground reflect flowing this way, and they would just be across.

NUBEL: Thank you. And so the nonPAG waste rock, that's going to go to a separate facility; is that right?

SCHULENBERG: That's correct.

NUBEL: And I will identify these images as NDEP 531. Are you familiar with them?

SCHULENBERG: I am.

NUBEL: Could you please tell me what they show?

SCHULENBERG: Sure. So the -- the main concern with the nonPAG waste rock disposal facility was the (indiscernible) Spring SP7 (phonetic), which is shown here in the figure to the right and basically is part of the application they included in the engineering design to create a collection gallery, which is kind of superimposed here and also a plan view up here, to collect any potential flows and route that away from the waste rock dump. And part of the SOC item included with the renewal is just to evaluate this and make sure that it'll work into the future, be a stout design.

NUBEL: So did NDEP find that adequate protections existed to ensure that the nonPAG facility will not result in harm to the environment?

SCHULENBERG: Yeah.

NUBEL: What will happen to these facilities upon completion of mining?

SCHULENBERG: So these facilities will be closed according to the tentative plan for permanent closure, at this point.

NUBEL: And what is the tentative plan for permanent closure?

SCHULENBERG: So a tentative plan for permanent closure is a plan that's submitted with their actual application. Prior to implementation, they file a permanent plan for closure just to kind of give an initial idea and strategy for how these facilities will be closed.

NUBEL: Is there a final plan that will be created?

SCHULENBERG: Yes, but that isn't required till a minimum of two years before the anticipated closure of the component.

NUBEL: So you have a tentative plan in the meantime, and then that plan can change up until two years before, and then Eureka Moly will have to complete a permanent plan (indiscernible) closure?

SCHULENBERG: Correct. And that'll be based off of additional characterization collected during operations.

NUBEL: Can you tell me a little bit about what the tentative plan for closure entails?

SCHULENBERG: Sure. For the PAG and waste rock disposal?

NUBEL: Yeah.

SCHULENBERG: Yeah, so for the PAG waste rock disposal facility, that'll include placement of a two-foot (indiscernible) cover that'll minimize infiltration to that -- what was it -- 3.8 times 10 minus (indiscernible) centimeters per second flux rate. And then, on top of the nonPAG facility, there'll be just the placement of growth media just for revegetation. And these facilities will also be recomped to a -- to a overall slope of 2.7 to -- 2.7 horizontal to 1 vertical to promote a stable slope.

NUBEL: So does this plan essentially try to reincorporate the facility back into the environment?

SCHULENBERG: Yes.

NUBEL: Does NDEP expect the plan to be effective?

SCHULENBERG: Yes, we do.

NUBEL: Does NDEP have a regulation prescribing the standard for a mine facility's release of contaminants?

SCHULENBERG: Yes, NAC 445A.424.

NUBEL: And what does that regulation provide?

SCHULENBERG: So that regulation provides that a mining facility cannot degrade groundwaters in excess of an established beneficial use or an established background concentration.

NUBEL: Given the procedures established by Eureka Moly for the disposal of waste rock, is NDEP satisfied that Eureka Moly has complied with NAC 445A.424?

SCHULENBERG: Yes.

NUBEL: Can you please tell me what a pit lake is?

SCHULENBERG: Sure. So a pit lake is the body of water resulting from a open pit going below the groundwater -- the natural surround groundwater elevation.

NUBEL: Does the NAC prescribe specific standards for pit lake water quality compliance?

SCHULENBERG: It does.

NUBEL: And what is that regulation?

SCHULENBERG: That's 445A.429.

NUBEL: Can you please tell me what that regulation provides?

SCHULENBERG: So that regulation provides that a pit lake cannot degrade groundwater and cannot adversely affect human, terrestrial, or avian life.

NUBEL: The regulation says "potential". How does NDEP interpret that term?

SCHULENBERG: We interpret that as not just any risk, but it needs to be a -- a meaningful risk.

NUBEL: Does NDEP use any outside standards for analyzing risk under this regulation?

SCHULENBERG: Yeah. So when analyzing pit lakes for that, for a potential risk, we use the same guides that the BLM does, and also that it puts from the EPA and Oak Ridge Laboratory for toxicity reference values.

NUBEL: Do you consider these standards to be generally accepted in the scientific community?

SCHULENBERG: From my experience, yes.

NUBEL: So let's discuss the second part of NAC 445A.429, which provides that a pit lake cannot have the potential to adversely affect the health of human, terrestrial, or avian life. Was there an ecological risk assessment performed for the expected Mount Hope pit lake?

SCHULENBERG: There was.

NUBEL: And what was that risk assessment called?

SCHULENBERG: That was called the Mount Hope screening level ecological risk assessment.

NUBEL: And are you comfortable with me referring to that as the SLERA?

SCHULENBERG: Yes.

NUBEL: Did the SLERA base its risk assessment approach on any sources?

SCHULENBERG: Yes, it did. It followed that guidance for BLM that I mentioned earlier, and also EPA.

NUBEL: So it followed the BLM and EPA guidelines?

SCHULENBERG: Yep.

NUBEL: Did it assign a number value to the amount of risk posed?

SCHULENBERG: Yes.

NUBEL: And is that number value called a hazard quotient?

SCHULENBERG: It is.

NUBEL: And it used the same hazard quotients established in the BLM's risk management criteria?

SCHULENBERG: Yep.

NUBEL: Can you tell me the criterias (sic) that were established for risk?

SCHULENBERG: Sure, so any resultant hazard quotient that's less than one is considered a low risk. One to ten is considered a moderate. Ten to a hundred is high, and higher than a hundred is considered extreme.
NUBEL: Did the SLERA contain inputs for expected water quality?
SCHULENBERG: Yes, it did.
NUBEL: And where did the SLERA get these numbers from?
SCHULENBERG: From the Mount Hope (indiscernible) pit lake model.
NUBEL: The SLERA then studied the water quality's effect on a variety of animals?
SCHULENBERG: Yes, they used a surrogate species.
NUBEL: And did the SLERA base its results on established toxicity reference values?
SCHULENBERG: It did.
NUBEL: Did the SLERA contain water utilization assumption?
SCHULENBERG: Yeah.
NUBEL: And what was that assumption?
SCHULENBERG: So basically, for the initial SLERA, they assume that the Mount Hope pit lake would be the only perennial water source in the area and would be utilized 100 percent for drinking water of the said surrogate species.
NUBEL: Why did it measure for 100 percent utilization?
SCHULENBERG: I think for conservatism, and it's also a good

starting point to move from. Assuming 100 percent exposure is the highest exposure you can get.

NUBEL: Right, so if a species were to have 100 percent exposure, and the SLERA showed that even at 100 percent, it posed no risk, then that really simplifies the study, correct?

SCHULENBERG: Correct.

NUBEL: Did the SLERA contain a risk assessment?

SCHULENBERG: It did.

NUBEL: What did the risk assessment conclude in regards to the water quality's effect on terrestrial and avian life with 100 percent exposure?

SCHULENBERG: There's no toxicological risk.

NUBEL: What hazard quotient was assigned?

SCHULENBERG: Oh, hazard quotient less than one.

NUBEL: Less than one --

SCHULENBERG: Yes.

NUBEL: -- which is the lowest achievable scientific risk standard?

SCHULENBERG: Yes.

NUBEL: Turning to livestock, did any constituents exceed their respective livestock watering standard under the assumption of 100 percent consumption?

SCHULENBERG: Yes, livestock was exceeded for fluoride and cadmium.

NUBEL: What hazard quotient was assigned to the probable risk for livestock?

SCHULENBERG: Less than one.
NUBEL: Less than one?
SCHULENBERG: Yeah.
NUBEL: So even -- let me rephrase that. Why was the lowest hazard quotient given despite these two constituents exceeding their water standard?
SCHULENBERG: So it was given based on the fact that the pit lake isn't meant to be used as a cattle watering source, then also the difficulty with which it would be for the animals to reach the water.
NUBEL: So what features of a pit lake make it unlikely for it to be used as a source of drinking water for animals?
SCHULENBERG: The steep side slopes and then the -- I guess just the actual depth to get to the water -- or the height to the water.
NUBEL: And there's no anticipated adequate protective cover for animals, right?
SCHULENBERG: No.
NUBEL: And there's no food sources?
SCHULENBERG: No.
NUBEL: Will there be any fencing that controls access to the pit?
SCHULENBERG: At closure, yeah, there will be.
NUBEL: Does the study's approach and results satisfy NDEP's requirement that the pit lake does not have the potential to harm human, avian, or terrestrial life?

SCHULENBERG: Yes, it does.
NUBEL: Will Eureka Moly be required to update its pit lake studies throughout the life of the mine?
SCHULENBERG: Yes.
NUBEL: And are those updates called continuing investigation items?
SCHULENBERG: They are.
NUBEL: Could you please tell me what other continuing investigation items exist within the permit?
SCHULENBERG: Sure. So the continuing investigation items consist of revised waste rock management plans, hydrogeologic flow models, pit lake studies, and a stream of (indiscernible) assessments.
NUBEL: And can NDEP make changes to the permit, depending on the results of these additional studies?
SCHULENBERG: Yes.
NUBEL: Thank you. That's all the questions I have for now.
GANS: Julie?
CAVANAUGHBILL: Just a couple of questions. With respect to the waste rock disposal facility that you were talking about, you were saying that there'd be no harm of leakage because it's going to drain down at the slope?
SCHULENBERG: Correct. Yeah, and with a lower -- or excuse me, a higher-permeability material at the base, yes.
CAVANAUGHBILL: Okay, but the waste rock dump is unsaturated,

correct? Is that true?

SCHULENBERG: Yes.

CAVANAUGHBILL: So that would flow differently than saturated material?

SCHULENBERG: Yes. Yeah, and there also would be -- so there would be saturated sections that would actually produce measurable flow. And that's kind of what would get routed, based off that design.

CAVANAUGHBILL: And these additional studies that you mentioned, have those been issued to the public, do you know?

SCHULENBERG: Additional studies? Sorry, I'm --

CAVANAUGHBILL: So you said there had been additional studies done?

NUBEL: Oh, he said there will be additional studies done.

SCHULENBERG: Oh.

CAVANAUGHBILL: And those will be publicly noticed?

SCHULENBERG: Yeah, yeah. That's with their five-year rule. Yeah, like the (indiscernible) groundwater flow model and all that.

CAVANAUGHBILL: Okay. And then the last, the SLERA that you talked about in terms of analyzing whether there would be harm to human, avian, or terrestrial life, that actually depends on the quality of the pit lake. You said you looked at the report on the model pit lake?

SCHULENBERG: That's correct. Yeah, the --

CAVANAUGHBILL: Okay.
SCHULENBERG: -- values are based off (indiscernible) weights, water intake, things like that, and then it's compared to the pit lake chemistry.
CAVANAUGHBILL: Okay. Based on the reports that are in the record?
SCHULENBERG: Correct.
CAVANAUGHBILL: Thank you. That's all I have for now.
NUBEL: I don't have anything else.
GANS: Lady first.
LANDRETH: Okay. No, I would just defer.
PORTA: Just real quick. With regard to the analysis that was done that was questioned, about the -- oh, the humidifier wall rock being only done -- conducted to find the kinetic rates for one week, and then that being inputted into the model, that's been said that that's not sufficient. How do you respond to that? Or do you think there's another method that could be used to get a better, oh, rate determination for the model?
SCHULENBERG: I kind of think that might be better for Mr. --
PORTA: Okay.
SCHULENBERG: -- Fred Johnson --
PORTA: Okay.
SCHULENBERG: -- to answer.
PORTA: Okay.
SCHULENBERG: Yeah, if that's okay with everybody.
PORTA: Okay.

SCHULENBERG: I can give you kind of my quick idea maybe. Yeah.
PORTA: Sure.
SCHULENBERG: If you're cool waiting for (indiscernible) --
PORTA: Yeah, all -- all right.
SCHULENBERG: -- little more experience than (indiscernible).
PORTA: Okay, okay. That's fine.
NUBEL: Mr. Johnson completed the study that's --
PORTA: Okay.
NUBEL: -- involved here, so he's very familiar with the --
PORTA: Okay.
NUBEL: -- testing that was completed.
PORTA: Okay. Then, with regard to the PAG and the cover at closure --
SCHULENBERG: Yeah.
PORTA: -- again, that was questioned that the material and the flow rate, the precipitation through there was not correctly done. What -- again, was it just best engineering practices that that cover material and depth of vegetation was used to determine how much material was used on top of the PAG?
SCHULENBERG: So they actually did a cover study based on that.
PORTA: Okay.
SCHULENBERG: And that was part of the waste rock management plan. I unfortunately didn't get that exhibit in there --

PORTA: Okay.

SCHULENBERG: -- to try to keep it just two binders.

PORTA: Sure.

SCHULENBERG: But yeah, so basically, they used a bunch of onsite assumptions and then also information collected from a nearby facility. And they used all those hydraulic parameters and everything to determine the two-foot (indiscernible) was a sufficient cover depth --

PORTA: Okay.

SCHULENBERG: -- to prevent infiltration.

PORTA: Okay. And is that process or technique that they used, has that been used in other mining facilities?

SCHULENBERG: Yes, it has.

PORTA: That analysis method, I guess we'd call it --

SCHULENBERG: Yeah.

PORTA: -- to do? Okay.

SCHULENBERG: And then on top of that, as well, the schedule of compliance, item number 2, is for a cover test plot study. So they'll be also constructing these using large-scale isometers and things like that to evaluate that cover of the mine life.

PORTA: Okay, so if it's determined to be insufficient, then a reexamination and possible additional layers or something, other mitigating factors will have to be implemented?

SCHULENBERG: Correct, yeah.

PORTA: Okay.

SCHULENBERG: This is just part of the initial tentative plan for permanent closure.

PORTA: Okay, thank you.

GANS: A couple questions. You talked about the 4,000-plus samples that were tested.

SCHULENBERG: Yes.

GANS: Is it your opinion that that's adequate?

SCHULENBERG: Yes. I think it was spatially representative, and it encountered a majority of materials that will be mined.

GANS: Okay. So we've -- we've read or heard -- and I'm -- now, I'm talking about a couple of previous meetings -- that that was inadequate --

SCHULENBERG: Yeah.

GANS: -- as far as Great Basin's concerned.

SCHULENBERG: Uh-huh.

GANS: Can you explain to me your understanding of why they feel that's inadequate and you feel it's adequate?

SCHULENBERG: So I think we feel it's adequate because it's all kind of based on site-specific characterizations. So the onsite geologist will do those field screening and preliminary assessments how I was talking about earlier. And they'll identify the major key components of those. And then, you don't necessarily need to just apply an arbitrary number, you know, like one sample for every four thousand tons. You know, if you know that -- you know, I guess four million tons is going to react the exact same, where it's got the same reactivity, you can kind of move forward and not require just -- kind of like I said, the arbitrary numbers.

GANS: Okay. You also said that -- or mentioned about the -- the reincorporation of the area back into the environment. Can you give me a little more specificity on that particular issue? What -- what do you mean by that, and what's it -- what does that entail?

SCHULENBERG: So that's basically meant for Todd, one of those people, but --

GANS: That's okay. And somebody else can address that more. I want more information on that, and if you're not the proper person, I understand.

SCHULENBERG: (Indiscernible).

GANS: Okay.

SCHULENBERG: Yeah, so the facility is meant to be, at closure, basically reclaimed to be a productive post-mining land use. So that means, you know, we regrade the slopes, make them aesthetically pleasing, shed water, keep water coming from PAG and nonPAG, and then -- I guess, kind of in a nutshell, that's --

GANS: Okay, so -- but some of those -- I'm going to call them hills -- (indiscernible) material, I think you said was, like, 900 feet high.

SCHULENBERG: Yeah, between 7 and 900.

GANS: Is there going to be a remediation of those mounds, I guess?

SCHULENBERG: Yeah, yeah. So those'll be recontoured and covered.

GANS: Okay.

SCHULENBERG: Yeah. But yeah, they will be there indefinitely.

GANS: So -- so this reincorporation is primarily directed at the waste material that kind of surrounds the pit; is that proper -- properly characterized or not?

SCHULENBERG: Yeah, I think so.

GANS: Okay. So in your opinion, what will it look like when this -- after 44 years of mining?

SCHULENBERG: Well, I think -- well, basically, the top of Mount Hope, not the actual mountain, will be, obviously, mined down and pretty deep. And there'll just be a surrounding -- basically hills -- hills surround the pit. Excuse me. Yeah.

GANS: And the pit is how deep?

SCHULENBERG: About 2,000 --

GANS: I mean, I realize it's on kind of an angle, but --

SCHULENBERG: -- from the highest extent of Mount Hope, I think -- of the mountain, it's 2,600 feet, about there in that -- that range. There's a cross-

section of that.
GANS: Yeah.
SCHULENBERG: The numbers would add up.
GANS: Okay. Thank you.
Nobody?
SCHULENBERG: Didn't they just --
GANS: Nothing else? Okay. Thank you very much.
OLSON: Just a clarification.
SCHULENBERG: Oh, for sure.
CAVANAUGHBILL: You said 4,000 samples. There are actually 1,844 samples taken, correct?
SCHULENBERG: Oh, yeah. Apologies, 4,000 analyses on 1,800 samples.
GANS: Thank you for that clarification.
SCHULENBERG: Yeah. I'm sorry.
CAVANAUGHBILL: That's okay.
GANS: Thank you.
NUBEL: NDEP would like to call its second witness to the stand, Dr. Christine Olson.
Dr. Olson, you currently work for the Nevada Division of Environmental Protection, correct?
OLSON: Correct.
NUBEL: Could you briefly describe your position within NDEP?
OLSON: Well, I'm an environmental scientist for the Bureau of Mining Regulation and Reclamation. My primary responsibilities are to review predictive studies for pit lakes, geochemistry, and

groundwater model reports.

NUBEL: Could you please tell me a little bit about your educational background?

OLSON: So I received my Bachelor's in Environmental Engineering from the University of California Merced. I received my Master's Degree in Hydrologic Sciences from the University of Nevada, Reno; and my Ph.D in Environmental Engineering also from University of Nevada, Reno.

NUBEL: And did you do a thesis as part of your Ph.D.?

OLSON: For my master's degree, yes.

NUBEL: For your master's, and what did that entail?

OLSON: So my master's thesis was a hydrogeologic study of the Lehman Creek watershed in the Great Basin National Park in eastern Nevada, and it was to evaluate how climate change would impact downstream water resources in that basin.

NUBEL: Do you have any experience in your educational background of reviewing and analyzing groundwater models?

OLSON: So for my graduate courses in hydrologic sciences, I took courses on groundwater modeling, hydrogeology, and groundwater chemistry. My graduate work was involved in developing a hydrogeologic study for a watershed in Nevada. And also for my dissertation for my Ph.D., it was a hydrogeologic study, but focused on (indiscernible) transport in soils and

groundwater and tundra ecosystems.
NUBEL: Did you prepare a PowerPoint for today's testimony?
OLSON: I did.
NUBEL: And are you prepared to testify regarding any information and documents contained within that PowerPoint?
OLSON: Yes.
NUBEL: Are you familiar with the 2010 hydrogeology study --
OLSON: Yes.
NUBEL: -- in this case?
OLSON: Yes, sir.
NUBEL: Can you tell me what it is, please?
OLSON: So this study was submitted with the application for the water pollution control permit, and it's a groundwater flow model to predict the impacts that may occur to the hydrogeology around the Mount Hope project site.
NUBEL: Have you reviewed that document in its entirety?
OLSON: Yes.
NUBEL: Are you prepared to discuss the contents of it today?
OLSON: Yes.
NUBEL: So could you please again reiterate, I suppose, the objective of the 2010 study?
OLSON: So the objective was to define the existing hydrogeologic conditions around the Mount Hope

project that exist today, then to make predictions as how impacts from mining when they dewater the surrounding aquifer around the pit lake, how that will change the hydrogeologic conditions around the mine site.
NUBEL: Why is that information important to NDEP?
OLSON: It's important in order for us to make an informed decision for issuing the water pollution control permit. That way, if we see that there need to be modifications or adjustments, that those can be made based on the information provided in these studies.
NUBEL: So are you okay if we generally discuss the results of the study first, and then discuss how the report came to those conclusions?
OLSON: Yes.
NUBEL: The report ultimately concluded that the Mount Hope pit lake would be a terminal sink; is that right?
OLSON: Yes.
NUBEL: Could you please explain to me what a terminal sink is?
OLSON: So I've included the figure here on the slide 2. It's a cartoon explaining a terminal pit lake. So within a terminal pit lake, you see here on this figure on the left that these arrows indicate groundwater flow into this pit, and you can have the water outflow through evaporation.

But in a terminal pit lake scenario, evaporation is high enough so that it depresses the pit lake water level below the surrounding groundwater aquifer. So that's all water that enters into the pit that can only leave through evaporation.

NUBEL: And this would be different than the concept of a flow-through pit?

OLSON: Correct. So a flow-through pit you tend to see more in precipitation-dominant areas where you can't have groundwater that flows into the pit. But because the pit lake can have a -- a level that is higher than the surrounding groundwater, pit lake water can flow back into the groundwater system.

NUBEL: NDEP's regulations require that a pit lake cannot degrade surrounding groundwater, right?

OLSON: Correct.

NUBEL: Can a terminal sink degrade surrounding groundwater?

OLSON: No, because pollution that's contained within water can only travel with the flow of groundwater; thus, for a terminal pit lake, since groundwater always flows towards the pit and never out, no pollution can affect groundwater around it.

NUBEL: Thank you. Could you please explain to me the tools that were used in the 2010 hydrogeology study to examine the conditions in the area?

OLSON: The modelers used a software code called MODFLOW-SURFACT. This was developed by the United States Geological Survey, and it's a 3D flow transport model that's widely accepted by the hydrologic community today. And it's used to simulate complex systems, such as what we have here at Mount Hope.

NUBEL: Can you please generally describe to me what a groundwater model is?

OLSON: So a groundwater model is a simplification of a physical system of interest. It starts as a conceptual model where you obtain all the information that you know, such as the hydrology, climate, the geology. And then the conceptual model is then transplanted into a mathematical model. A model essentially is constructed like a large grid made of many cells, and so you take those properties that you know and you apply it to these cells. And then, there are governing equations that describe the flow and transport of water through the ground, and so these are used, for example, to predict changes that could occur in flow or volume of water stored in the groundwater in the ground system.

NUBEL: And so this model takes inputs, correct, that are put into it?

OLSON: Correct.

NUBEL: And then it uses those inputs to generate outputs and results?

OLSON: Correct.

NUBEL: Have you reviewed the models that were developed for this project?

OLSON: Yes.

NUBEL: And in your opinion, were the models developed and constructed using programs and techniques that are generally accepted as models in the field?

OLSON: Yes. MODFLOW-SURFACT is a very common model type of code used to understand how a mine will impact groundwater systems, and it's widely used and continually developed as time progresses.

NUBEL: The model looked at data from both the regional and local conditions around the area, correct?

OLSON: Correct.

NUBEL: Are you familiar with this image, which I will identify as NDEP 1423?

OLSON: Yes.

NUBEL: And what does it show?

OLSON: So this is figure 4.21 in the hydrogeologic study. And so this just shows the extent of the regional model which is depicted by the red line, and this encompasses Kobeh Valley, Antelope Valley, Diamond Valley, and Pine Valley, as these are hydrogeologically connected to the Mount Hope project.

And so as you can see, this is a grid made of many cells, and within the regional model there is a local model that has finer grid cell size so that the modelers could make more refined computations of pit infilling of dewatering within the local model around the Mount Hope project site.

NUBEL: Could you please identify for me the modeling inputs for the regional model?

OLSON: So generally, the modeling inputs for the geology, precipitation and recharge, surface and groundwater recesses, water budgets, and the aquifer hydraulics.

NUBEL: So the first regional model input is geology, right?

OLSON: Correct.

NUBEL: And why is geology important?

OLSON: Geology is important because it sort of defines your model system. And the type of rocks can, for example, influence how water flows through the rocks, the amount of water that can flow through the rocks, and it can also give some indication of the type of chemistry you might expect to be found within an aquifer within a certain rock type.

NUBEL: Are you familiar with this image on the right, which I will identify as NDEP 1324?

OLSON: Yes.

NUBEL: And what does it show?

OLSON: So this is figure 3.14 in the hydrogeologic study, and this shows the major rock types in the four basins. And so you can see here in the -- the light brown color, this is -- typically in the valley you usually fine alluvial, which is essentially broken-down mountain material, and it can be sort of gravelly, sand, silts, and clays. It may have a higher amount of water that can flow through it, through the gravelly unconsolidated material.

In the bright colors, the blues and the reds, you have intrusive, extrusive, and volcanic, igneous-type rocks. And those are typically -- or those are essentially the rock types that we see at Mount Hope since it's up in the mountains.

NUBEL: And could you just briefly explain to me the source of this data and information?

OLSON: So this is based off of USGS reconnaissance reports and from field studies of geologists who've identified and studied the geology in this region.

NUBEL: The next regional model input is precipitation and recharge, right?

OLSON: Yes.

NUBEL: And why is that important to the model?

OLSON: So precipitation and recharge is a major component of the overall water budget and inflow of water into the system; thus, it must be accounted for for the overall water budget.

NUBEL: And you are familiar with this image, which I'll identify as NDEP 1330, correct?

OLSON: Correct. So this is figure 3.2.2 from the hydrogeologic study, and this is just a snapshot of some of the data they collected for precipitation. They obtained their precipitation data from 5 different sources, but this graph shows the 20 weather stations in and around the study area where they collected very long-term data record sets for precipitation.

You'll notice that it shows the average annual precipitation rate here on the Y-axis, and the -- the elevation of the station on the X-axis. And this is because there is typically a correlation between these two as you see higher precipitation and recharge in mountainous areas and lower down in the valleys. So we see this trend, as we would expect to see, for the weather station data from around the Mount Hope project site.

NUBEL: And your --

OLSON: In addition --

NUBEL: Oh, sorry. Continue.

OLSON: In addition to this, they also collected data from the Western Regional Climate Center, from USGS reconnaissance reports, National Weather

Service 30-year precipitation normal records; and so that there were many sources obtained for precipitation.

NUBEL: In your opinion, had sufficient data been collected to calculate precipitation and recharge rate?

OLSON: Yes. Based on the studies I've reviewed so far, there may be five to ten weather stations that are included in such studies, and maybe a comparison to one other source that, for the Mount Hope project, they select -- they obtain precipitation data from at least five sources with very long records.

NUBEL: Okay. And the third regional model input is surface water resources, right?

OLSON: Yes.

NUBEL: And why does that matter for the model?

OLSON: So surface water resources are important because it identifies potential inputs and outputs into the system and account. It's another piece of the overall water budget.

NUBEL: And are you familiar with the image on the right, which I will identify as NDEP 1370?

OLSON: Yes. So this is figure 4.17 in the hydrogeologic model, and this shows the distribution of evapotranspiration rates in the four basins. And so how they did this is they did a detailed inventory of phreatophytes in these basins. And phreatophytes are essentially plants with a long root system that can extract groundwater and then evapotranspirate that groundwater into the air, so it's a loss. So in this figure they show the different phreatophyte species by color, and this was translated into an evapotranspiration rate in inches per year out of these four basins.

NUBEL: And could you briefly tell me what evapotranspiration means?

OLSON: So evapotranspiration is water that is released into the air in a vapor form.

NUBEL: Okay. Thank you. And are you familiar with this image, which I will identify as NDEP 1506?

OLSON: Yes.

NUBEL: And what does it show?

OLSON: So this shows plate 2 in the hydrogeologic model and this is a spring inventory of that. And so it's a little hard to see, but these blue lines indicate the springs that the authors identified in the four basins, and they did a very detailed assessment. There are over 200 springs identified from field studies, and then they also obtained data from USGS hydrographic and topography maps too, for this data.

NUBEL: Did you find this data to be a comprehensive inventory of the surface water resources within the area?

OLSON: Yes.

NUBEL: Next, the regional model looked at the groundwater resources, right?
OLSON: Correct.
NUBEL: Why is that important?
OLSON: So groundwater is an essential part of the overall budget, and to understand how much water and the groundwater elevation within the four basins that were studied.
NUBEL: Are you familiar with this image, which I will identify as NDEP 1344?
OLSON: Yes. So this is figure 3.4.6 in the hydrogeologic study, and this shows just some of the well locations where they obtained data, which is indicated by these little red dots. But there are over 400 wells that they sampled from, and over 4,000 measurements that were taken of water level from these wells, and they also obtained data from USGS reconnaissance reports. But using this data, they were able to determine the groundwater elevation as depicted by these blue lines; thus, they were able to translate this information to what's called the steady-state part of the model, which is understanding the existing conditions before they can make a predictions model.
NUBEL: In your experience, is 400 wells a sufficient data point?
OLSON: Yes. This is by far the most data I've seen

collected for groundwater in any model study to date.
NUBEL: And next, the regional model looks at water budgets, correct?
OLSON: Correct.
NUBEL: What is a water budget?
OLSON: So a water budget is just an accounting for your inputs and outputs into a system of interest. So your inputs would be precipitation, groundwater inflow; and your outputs would be evapotranspiration, groundwater outflow, for example.
NUBEL: Are you familiar with this image, which I will identify as NDEP 1250?
OLSON: Yes. So this is table 3.51 in the groundwater study, and this shows the major inputs and outputs for the hydro -- the major hydrogeographic areas within the study. And so you can see you have estimated groundwater recharge in acre feet per year, the estimated evapotranspiration or discharge in acre feet per year, subsurface outflow, and surface water generated in these basins within the study.
NUBEL: Can you please tell me the source of that data?
OLSON: So this is also based off of USGS reconnaissance reports.
NUBEL: The last regional model input is aquifer hydraulics, right?

OLSON: Correct.

NUBEL: And why are aquifer -- well, what is aquifer hydraulics?

OLSON: Aquifer hydraulics is properties that relate to the aquifer, such as how much water can flow through the aquifer, what volume can flow through, what volume can be extracted. And it -- they are properties that essentially relate to the flow and storage of water in aquifers.

NUBEL: And you're familiar with this image, which I will identify as NDEP 1352?

OLSON: Yes. So I should also mention that aquifer hydraulics are determined from well-pumping tests and -- such as packer test, flood test, and a variety of tests to -- to understand these aquifer hydraulics. But that would -- if you do have a water background, that would be for example transmissibility, hydraulic conductivity, and other parameters that relate to water flow and storage.

And so in this figure, 3.61 is also from the hydrogeologic study, and it's just a small snapshot showing the well-pumping test data that was done for the study. And this is -- so here is the Mount Hope project, it's this yellow star; and these aquifer well tests were done in the Kobeh Valley, which is the main area where the mine will do its dewatering to lower the groundwater level near the Mount Hope project. But this is just, again, a small snapshot of the well tests that they did. They did easily in the hundreds of well tests throughout the whole study area.

NUBEL: Okay. So let's turn to the local model input. Could you please tell me what the inputs are for the local model?

OLSON: So the inputs are very similar to the regional model. They would include precipitation and runoff and groundwater infilling.

NUBEL: But as you stated earlier, the local model was more specifically at the actual mine pit area, right?

OLSON: Correct. So the -- the main system of interest would be the pit lake and how these components relate to pit infilling once mine dewatering ceases.

NUBEL: And are you familiar with this image, which I will identify as NDEP 310?

OLSON: Yeah. So this is figure 3.1 in the geochemistry study, but it's just a cartoon to demonstrate the inflows and outflows that they expect to see at the Mount Hope project. And note that there is only groundwater inflow and not groundwater outflow because we expect this to be a terminal sink, and there is also evaporation. Direct precipitation onto the lake, and then precipitation that could fall onto the pit wall and run -- enter into the pit is identified as runoff.

NUBEL: Okay. So inflow is the water that actually comes into the pit; is that right?

OLSON: Yeah, groundwater inflow. Correct.

NUBEL: Okay. And then outflow would be, in this case, evaporation is how it exits the pit?

OLSON: Yeah, the only outflow term for this system would be evaporation.

NUBEL: So why is the rate of direct precipitation important?

OLSON: So direct precipitation is a major piece of the overall water budget, and it's going to add water to the pit lake.

NUBEL: And could you tell me what runoff is?

OLSON: So runoff, again, is just precipitation that falls onto the pit wall and can enter the pit. In this -- for this model, they assumed that 30 percent of precipitation that hits the pit wall will enter into the lake.

NUBEL: Could you please tell me the rate of direct precipitation in the future mine pit area?

OLSON: So the direct precipitation rate was approximately 15 inches per year that would fall into the Mount Hope pit lake.

NUBEL: And how is that data input determined?

OLSON: So they obtained this data from PRISM (phonetic), which is an algorithm that uses terrain data such as slopes and aspect, and features that -- in mountainous areas; and then it uses regional precipitation data to calculate a precipitation rate for the site.

NUBEL: Did you review other Nevada studies in preparation for today's testimony?

OLSON: Yes.

NUBEL: And how does the rate of direct precipitation at Mount Hope compare with those studies?

OLSON: So based on -- so the Mount Hope project sits around 6,000 feet elevation. And if you recall, I had mentioned earlier in the presentation that precipitation tends to have a correlation with elevation. And so I looked at 15 other pit lake studies that were submitted to the Division in recent years, and plotted this along this regression of precipitation in elevation. You'll see that Mount Hope is actually slightly higher than precipitation values reported at this similar elevation; however, it's not an outlier, and it falls within this trend that you would expect. And it might be a -- a slightly conservative end for a precipitation estimate.

NUBEL: Did you find the rate that was calculated to be reasonable?

OLSON: Yes.

NUBEL: And the next input is evaporation, right?

OLSON: Yes.
NUBEL: Why is evaporation important to the model?
OLSON: So evaporation, especially in Nevada, is a major component of the overall water balance equation that must be accounted for; and in the system, it would be the only significant loss out of the system.
NUBEL: How did the study determine the rate of evaporation?
OLSON: So evaporation was determined from pan evaporation rates. And pan evaporation is just essentially a pan that is located at a weather station with water, and it measures the amount of evaporation that occurs out of the pan. But in order to translate this to a lake body, the modelers will typically use a coefficient. For this study, they used .73, which is a reasonable coefficient. And so the evaporation rate they determined from this was, I believe, around 37 inches per year.
NUBEL: Is the pan method a widely used scientific method?
OLSON: It's the most commonly used method for -- to determine pit lake evaporation in the State of Nevada.
NUBEL: And did you review other Nevada studies regarding the rate of evaporation?
OLSON: I did. And so these are the same studies that I

showed you for the comparison for precipitation rates for pit lake studies across the state that were recently submitted to the Division. And so here's the Mount Hope estimation in inches per year, around 37 inches per year. And it falls within the range of evaporation rates that you see at this elevation. And they range -- they tend to range more than precipitation, but between 25 to 45 inches per year. So it falls reasonably within that range.

NUBEL: Thank you. The last local input is groundwater inflow, right?

OLSON: Yes.

NUBEL: Could you tell me what groundwater inflow is?

OLSON: So for this model, they used groundwater levels around the Mount Hope pit and also aquifer hydraulics to determine the amount of water that could inflow into the pit lake.

NUBEL: And are you familiar with this image on the right, which I will identify as NDEP 310?

OLSON: Yes. So it's just -- just again the cartoon showing the major inputs and outputs for the pit lake.

NUBEL: And the groundwater inflow is located on both sides of the central model?

OLSON: Yes.

NUBEL: Did you find that the amount of data gave a sufficient understanding of the groundwater inflow within this area?

OLSON: Yes.

NUBEL: So let's move on to the results. Are you familiar with this image, which I will identify as NDEP 1496?

OLSON: Yeah. So this is a really key figure in the report. This is figure 4.516. So I'm just going to walk you through it.

So here on the Y-axis, this shows you the elevation in feet about sea level. And here on the X-axis, this is east-west coordinates. Here, this solid line, this is the topography surrounding the pit. This dotted line is -- represents the pre-mining topography before the mine -- before the pit is mined out. Here in this blue dotted line that shows the 2009 groundwater level for the pre-mining groundwater level conditions.

And so in the colored lines -- so please note also, this is a vertical exaggeration of 5.21, this image. But this shows the pit infilling over the time steps of the groundwater model starting at 00 at 4,690 feet above sea level, going to 10 years, 50 years, 100, 200, and the final pit lake stage at 1,500 years. And if you'll notice, this is approximately 400 feet below the original groundwater level; and so groundwater can only flow from a higher level to a lower level.

And so you'll notice that as you come out of the pit, these levels sharply increase, the groundwater levels. So thus, any groundwater inflow -- or any groundwater flow that can occur can only flow into the pit because you have this very steep gradient between the groundwater level surrounding the pit and then the actual pit lake elevation. So it's a very strong terminal sink system.

NUBEL: So I see at the top color line measure it says projected equilibrium, which is at 1,580 years?

OLSON: Yes.

NUBEL: Could you please tell me what equilibrium is in the context of pit lakes?

OLSON: So equilibrium is essentially a steady-state value that is reached where we don't expect the pit lake level to increase or decrease much in the future after that time.

NUBEL: Okay. Did the results show that the pit lake would form a terminal sink?

OLSON: Yes.

NUBEL: And this is because the outflow evaporation would exceed the inflow?

OLSON: Yes. Because the terminal sink exists because evaporation is so high that it depresses the pit lake water level compared to the surrounding groundwater level.

NUBEL: So the report concluded that the pit lake poses no risk to degrading the surrounding groundwater?
OLSON: No, because this is such a strong terminal sink system, any potentially polluted water that would be in the pit would not be able to flow out because of this very strong gradient around the pit.
NUBEL: Right. So the pit lake -- or the study concluded that the pit lake poses no risk of degrading surrounding groundwater?
OLSON: No.
NUBEL: Yes.
OLSON: Oh, yes, sorry. Yeah --
NUBEL: It does not?
OLSON: -- no, it does not pose any threat to degrade the groundwater.
NUBEL: Okay. Thank you. Could you please tell me what a sensitivity analysis is?
OLSON: So a sensitivity analysis is adjusting model inputs to see how sensitive the model is to these inputs and to assess how the model results may change with different inputs.
NUBEL: Why is a sensitivity analysis done?
OLSON: A sensitivity analysis is done to sort of evaluate sort of the extreme ends of what's unlikely to occur, but what could occur. Rather than just having one solution and one outcome for the model, you can see how, for instance, if

precipitation increases (indiscernible) evaporation increases, how this impacts the pit lake in this case or the existing hydrogeologic conditions.

NUBEL: And are you familiar with this image, which I will identify as NDEP 1311?

OLSON: Yes. So this is table 4.52, and this just summarizes the sensitivity analyses that were performed for this project. And so the input parameters they varied were specific yield, percentage of precipitation runoff, lake surface precipitation input, lake evaporation, and lake cell conduction. And so they varied these individually, but they also combined these and did a multivariant analysis to sort of compound these -- these scenarios into what could occur with the absolute worst-case scenario.

NUBEL: So in essence, to create a worst-case scenario, you notch the volume of, let's say, direct precipitation up?

OLSON: (No verbal response)

NUBEL: And you would then notch the amount of evaporation down?

OLSON: Yes.

NUBEL: And then other sources of inflow will also get ratcheted up; is that right?

OLSON: Correct. So for -- they did what was called the high-multivariant sensitivity analysis where they increased the specific yield precipitation and decreased evaporation, and increased the amount of water that could flow into the lake.

And so even under all these adjusted parameters which would increase the lake-stage level, the lake -- the final pit lake still remained 173 feet below the surrounding groundwater aquifer; thus, it still remained a strong terminal sink. We don't expect these conditions at all to be able to occur, but it's sort of an extreme worst-case scenario.

NUBEL: So even under the worst-case scenario, it's still expected to be a terminal sink?

OLSON: Correct.

NUBEL: Discussing the quality of the report as a whole, were you satisfied with the data that was input into the models?

OLSON: Yeah, this was -- there was an enormous amount of data that was put into this study that spanned over many years of data collection and data records. So yes, I believe it's sufficient.

NUBEL: Did you find that scientifically accepted methods were utilized?

OLSON: Yes. They used MODFLOW modeling code which is still accepted and used today. And the data that they collected still -- it still works for today. There haven't been any major changes.

NUBEL: And you found that the results were supported by the accepted scientific methods utilized?

OLSON: Yes.

NUBEL: Are you familiar with Great Basin Resource Watch's comments and concerns regarding the Mount Hope mine?

OLSON: Yes.

NUBEL: Is one of those concerns adequate well coverage?

OLSON: Yes.

NUBEL: Are you familiar with this image, which I will identify as NDEP 663?

OLSON: Yeah. So this is a figure in the geochemistry report, and it shows the -- the well locations surrounding the Mount Hope pit lake in the yellow and the red. And so these are monitoring wells; and if you look at these blue lines here, these are the groundwater levels ranging from approximately 7,000 feet down to 6,000 feet. And so the groundwater always flows perpendicular to these contour lines. So any pit lake outflow that could occur, it would generally flow in the south -- southern to southeastern direction. So we believe there's adequate well coverage on this side of the pit to determine whether any outflow would occur, but we don't expect there to be.

NUBEL: So in your opinion, are additional simulated monitored wells needed to show that the pit lake will be safe?

OLSON: No. And based on the calibration of the model to assess how well the simulated monitoring well levels were compared to actual, it was a very good fit; thus, we think that adding additional wells would not improve our understanding of the hydrogeologic conditions around the Mount Hope site.

NUBEL: And another concern of Great Basin Resource Watch is related to the recovery time; is that correct?

OLSON: Correct.

NUBEL: Could you please explain to me your understanding of the substance of that concern?

OLSON: So their concern is that during the initial pit filling, the pit lake tends to be precipitation dominated as a major component to the pit lake. However, when you look at the simulations for the pit levels at the end of dewatering, and then once the pit reaches equilibrium, we see a very strong terminal sink condition as indicated by these concentric groundwater contour lines that go from 4,900 --

So here on the left, this is the groundwater contour level just at the end of pit dewatering. And so you can see that it still acts as a very strong terminal sink where groundwater must flow into the pit. And this simulation was carried out to equilibrium conditions and they're still -- these concentric circles, that's groundwater inflow, must always be towards the pit. So there is never any prediction during the filling that these contour lines would change so that groundwater outflow could occur from the pit.

NUBEL: Okay. And to be clear, when you were saying the image on the left, you were referring to NDEP 1486?

OLSON: Correct. And NDEP 1492 on the right.

NUBEL: Thank you. To your knowledge, does Great Basin Resource Watch have concerns regarding the faults within the pit?

OLSON: Yes.

NUBEL: And what is that concern?

OLSON: And so the --

CAVANAUGHBILL: Mr. Chairman, I'm sorry to interrupt, but none of these were included in our appeal. They were in our original comments, but they aren't included in this appeal that's before the Commission, so I'm not sure how they're relevant. And we didn't bring these concerns forward in the appeal.

GANS: Do you want to address that?

NUBEL: Sure. They were brought up in the comment letter which we've been discussing today, which threw a lot of issues with the pit lake studies and the hydro -- hydrology study out there. So to be comprehensive, we were addressing all of the concerns, and not just what were brought in the brief, but also that Great Basin Resource Watch

is right within the public documents they provided.
GANS: Is this pertinent to you, Tom?
PORTA: I would rather hear just the basis of the Appellants' arguments.
NUBEL: Sure.
PORTA: Yeah.
NUBEL: This was the last --
CAVANAUGHBILL: I feel the say way.
GANS: I think that's the consensus up here, that we would agree with the Appellant that let's just focus on the appeal.
NUBEL: Absolutely, yeah. If they're not contesting this issue any longer, then we can certainly save the time on it.
CAVANAUGHBILL: Thank you.
NUBEL: Then that was all the questions that I had for Dr. Olson.
CAVANAUGHBILL: All right. I have a couple of questions, if I may?
GANS: (No verbal response)
CAVANAUGHBILL: So have you -- do you believe the model of the pit lake in this particular project, Mount Hope project, is accurate?
OLSON: I believe it is reasonable.
CAVANAUGHBILL: That it's reasonable?
OLSON: Yes. And I believe, yeah, that it's relatively accurate. I mean, no model is perfect, but they

do a good job at quantifying the uncertainty in the model and discussing sources of uncertainty. But overall, we believe that this was done in a good faith effort.

CAVANAUGHBILL: Okay. And do you think -- have you ever personally observed a pit lake model that would -- that actually predicted the water quality correctly?

OLSON: I haven't because I've been in this position for less than a year. So the reports I reviewed so far that have been submitted to us have been made for predictions for pit lakes that have not yet occurred. However -- yeah.

CAVANAUGHBILL: Oh, yeah, you just -- just yes or no. Have -- and do you have any background -- have you done any actual geochemical characterizations yourself?

OLSON: No, I haven't, but I --

CAVANAUGHBILL: Okay.

OLSON: -- my --

CAVANAUGHBILL: Besides your coursework or your thesis?

OLSON: So by characterization, do you mean by understanding, like, analyzing the geochemistry of the samples?

CAVANAUGHBILL: Yes.

OLSON: Yes, I have, then.

CAVANAUGHBILL: And when was that?

OLSON: This was during my graduate coursework, where I

collected many samples and did geochemical analysis.
CAVANAUGHBILL: So have you ever --
NUBEL: I'd like to object to this line of question because we're offering Dr. Olson for her expertise in hydrology --
GANS: Okay.
NUBEL: -- which is the way that the water flows into the pit and that it's going to be a terminal sink, not on the issue of water quality, which will be addressed by our other expert. And she did not go into the issue of water quality in her direct exam.
GANS: Okay. And I -- and I thought the same thing. I was going to ask you some questions, but I wasn't going to ask you questions on water quality, so I'm not sure where you're going. I understand what you just said, and that's what I thought she was an expert on.
CAVANAUGHBILL: Thank you for that clarification. So what is your background in hydrology besides the coursework and the graduate work; do you have any field work experience?
OLSON: Yes, I do. Mostly computer work. So for the hydrogeologic model I studied and developed in the Lehman Creek watershed, I had to, much like how model studies are done, collect data, data inputs, construct the model, and analyze

different results based on, for instance, my thesis work was understanding how climate change could impact a water budget in a system in Nevada.
CAVANAUGHBILL: Okay. Thank you.
NUBEL: I don't have any further redirect.
GANS: Okay. I don't either. Thank you very much.
NUBEL: Do you mind if we take just a few minutes' recess?
GANS: Sure. We'll do, what, ten minutes? How much you need?
NUBEL: Five.
GANS: Oh.
NUBEL: Ten, if you want ten.
OLSON: He's quick.
GANS: Yeah, let's do ten minutes.
NUBEL: Okay. We're going through pretty quickly, I think.
GANS: Yeah, we are. And I -- but I want people to get back in here on time, that's why I'm --
(Recess taken)
GANS: Okay. We're reconvening and it's 2:33. That's better than ten minutes, you guys did great.
NUBEL: As its next witness, NDEP calls Brent Johnson to the stand. And some of the topics we will be discussing are fairly technical, so I would welcome, if it's appropriate to the Chairman, if there's any questions that arise from the panel

throughout about a concept we're talking about, that -- please feel free to interrupt me.

GANS: We will. We kind of refrain from doing that, but when there's a screen up there and I'm confused about something that's up there, I interrupt. But we'll try not to interrupt you.

NUBEL: Sure. And I welcome it if it helps you understand, so.

Mr. Johnson, could you please describe your educational background to me?

JOHNSON: Yeah. I have a Bachelor's Degree in Geology, and a Master's Degree in Geology from the University of (indiscernible).

NUBEL: And what about your professional background?

JOHNSON: I have 25 years of -- of consulting experience, the vast majority of that is mining-related -- related to mine waste products and -- and mine (indiscernible).

NUBEL: How many pit lake studies have you completed?

JOHNSON: I've directed and executed about 57 pit lake studies, and reviewed about 10 to 12.

NUBEL: Do you believe you have professional or educational experience reviewing and analyzing the environmental effects of mining operations?

JOHNSON: Yes.

NUBEL: And did you prepare a PowerPoint for today's testimony?

JOHNSON: Yes.

NUBEL: What is the purpose of that PowerPoint?

JOHNSON: Hopefully to keep everyone awake a little bit longer, and like you said, it's a lot of complicated, complex things and sometimes visuals really help.

GANS: And I'd ask you to kind of keep it as simple as you can so that we get it. I mean, your testimony is going to be important, so I want to understand it if I can.

NUBEL: Are you familiar with the Mount Hope site?

JOHNSON: Yes.

NUBEL: And how did you become familiar with it?

JOHNSON: So one of the exhibits is the pit lake study, which I was the primary author on that study when I worked for Schlumberger Water Services.

NUBEL: And you were a consultant when you did that?

JOHNSON: Yes.

NUBEL: Did you consider your work to be biased?

JOHNSON: So the bias question came up earlier today, and it struck me as interesting because my responsibility to my clients is to do the opposite of what you might expect, which is to try to -- to make things better than they appear or that they actually might be.

In my opinion, it would be remiss of me not to point out those -- those types of issues or risks to my client. In this case, it was Eureka Moly, but I -- I take that approach on all of my projects. And I would also lose credibility with the agencies that I work with and often work for the agencies as well. So the answer would be if I'm biased, it would be in the other direction than we were contemplating.

NUBEL: Are you familiar with the Mount Hope pit lake geochemistry report?

JOHNSON: Yes.

NUBEL: And why are you familiar with it?

JOHNSON: As I said, I -- I was the prime author.

NUBEL: What was the objective of the report?

JOHNSON: The objective, in the simplest terms, is to predict the water quality of the pit after closure of the mine. That is as simple as I can put it. It's very complicated, but that's the goal of the -- the report.

NUBEL: Did you develop a conceptual model to begin your prediction of pit lake chemistry?

JOHNSON: Yes.

NUBEL: Are you familiar with this image, which I will identify as NDEP 310?

JOHNSON: Yes.

NUBEL: And is this that conceptual model?

JOHNSON: Yes.

NUBEL: Could you please show me what the conceptual model entails?

JOHNSON: So you've seen this several times now. I'll try to make this quick and -- and focused on the geochemistry aspects of this. The flow is in the blue arrows going into the pit lake. But each one of those blue arrows, be it from groundwater inflow, or the precipitation, or the evaporation, has an associated chemistry with it. And so when you combine the flow of each of these components with the chemistry in a model, then you can use that model to predict through time how the pit lake water -- water quality is going to be.

NUBEL: Did you also use a numerical model in creating the report?

JOHNSON: Yeah. So the conceptual model is really just to get your head around all of the mechanisms and the processes that you want to simulate in the numerical model.

NUBEL: And what is a numerical model?

NUBEL: So it takes basically what I just described as the flow rates and the concentrations of each of these components that you see in the conceptual model and puts numbers to them. So through time, we know that the groundwater inflow rates are going to start at -- at a fairly high number, and then decrease through time as the pit lake fills. The evaporation, we have good quality data on the flow rate of evaporation, and inflow -- well, runoff flow data and the chemistry data that are populated into the -- the numerical model.

And do you want to introduce this?

NUBEL: Yeah, sure. So are you familiar with this slide?
JOHNSON: Yes.
NUBEL: And did you create it?
JOHNSON: Yes.
NUBEL: What does it show?
JOHNSON: So this is -- you don't have to read all the little boxes, but what I want -- what I wanted to just point out quickly is that we have three, kind of, columns. The blue column is the flow rate. So we have flow data that Christine described from the groundwater flow model and the pit lake water balance model. So we have the flow rates from the various components of the geology that Matt described, how that is used to -- using test work to get chemistry estimates, and we have chemistry data from, say, the individual flows. Like groundwater inflow also has a chemistry related to it.

All of this is combined as input to a -- a model, a numerical model. In this case, it's called PHREEQC, and I can describe just briefly, PHREEQC stands for pH reaction equilibrium, and it's written in the computer program C, so they stuck the C on the end. So PHREEQC is the name of the model that used to do all the heavy lifting of the computations involving the -- the mixing of the waters and the reactions of the waters.

NUBEL: Is the PHREEQC a scientifically-accepted geochemical model?

JOHNSON: Yeah. It's a -- a very well-established model developed originally in the late '60s, early '70s by the USGS. It's undergone several iterations now, but it's basically the same model, and it's very widely used. Virtually all reactive geochemists' work is done with PHREEQC or one or two of the other models.

NUBEL: And so the PHREEQC model contains various inputs, correct?

JOHNSON: Correct.

NUBEL: And is one of those inputs groundwater chemistry?

JOHNSON: Yes. So in this exhibit, NDEP 314, this again, you've seen this map several times and you're probably getting used to it. In the middle is the -- the open pit at the end of mining, and then the -- the various waste rock facilities around the outside edge. As input for groundwater chemistry for the model, we used actual site-specific data from four wells, each of these representing a quadrant of flow from the groundwater flow model.

So for example, groundwater flowing from, say, the northwest quadrant into the pit would be represented by -- by this well here. And then the chemistry flowing in from this direction would be represented by that well, et cetera, et cetera.

NUBEL: And why is groundwater chemistry important to input into the model?

JOHNSON: So it -- it's -- groundwater inflow to the pit lake is the major component, especially in the early filling parts of filling. So when you turn off the pumps after you're finished mining, there are very steep gradients of groundwater into the pit, pumps go off and you get a fairly high groundwater inflow to the pit over the first -- it's dominated by groundwater over the first 150 years, so it's a very important component of the outcome.

NUBEL: And is another input for the model pit wall rock type?

JOHNSON: Yes. So as -- as Matt kind of described this -- described this input earlier, this one looks familiar. I think it was this one here --

NUBEL: Would you please identify the exhibit you're looking at?

JOHNSON: Yeah, sorry. NDEP 294. Matt showed this, and this is really just a directly top-down view of the pit. And -- and there's an immense amount of work that goes into -- into determining the location of the ore body and the grade, and the geology, and the alteration. I mean, it's in the mine's best interest to really drill out and explore, and ensure they understand the geology very well around the pit if they're going to make an economic decision on that. So the data are very robust. They -- they were used to not only build the geologic model, but then the sampling that Matt described earlier for the humidity cell test, and the other tests, was collected during that exploration program.

In NDEP 296, another top-down view, this just shows the -- the PAG exposures on the ultimate pit lake. These are obviously important to us if we want to understand how the pit lake will evolve through time. We need to know how much PAG material, PAG being potentially acid generating, is going to be exposed in the -- the final pit. And in -- I'm sorry, in this case it was 16 percent of the pit is -- has exposures of PAG material remaining, 74 is nonPAG material.

NUBEL: Okay. So -- and you identified it as the NDEP number on the left, I believe?

JOHNSON: On the left-hand side, if I didn't, it's NDEP 296.

NUBEL: Okay. And you said that the pit -- the final pit wall is going to be 16 percent; is that what you said for PAG?

JOHNSON: Yeah, that's correct.

NUBEL: Okay. And that's separate -- separate from the number that Matt talked about, which is the waste rock that's going to be collected, and the percentage of that waste rock which will be potentially acid generating?

JOHNSON: Yeah, that's correct. So the bulk of the waste rock as a slightly different proportion. So Matt described it was 26 percent of the total waste rock would be PAG, which will end up in the PAG waste rock facility. And then the exposure, though, in the pit is only 16 percent.

NUBEL: And the pit wall, it's important to identify the components of the pit wall because when water comes into the pit, it will be coming into contact with the pit wall; is that right?

JOHNSON: That's correct. So when precipitation occurs on the pit wall, a portion of that -- the majority of that precipitation just evaporates fairly quickly in Nevada. But some portions of that, especially during maybe big rain events, a gully washer you might say, a portion of that runs down the pit and ends up in the lake. And the water takes on the character of whatever rock it flows over. So that's how we determine what proportions of pit wall runoff end up in the lake, and the effect that that has on the chemistry in turn.

NUBEL: And another input into the model was direct precipitation, right?

JOHNSON: Correct. Direct precipitation is really simple. It's just the rain that falls on the lake. And of course, it doesn't interact with any water, so it comes in as what we'd call pure water.

NUBEL: And one more consideration for the model would be evaporation?

JOHNSON: And again, that's correct. A very important one. Long-term, we know that that affects the sink and the lake, but it also removes pure water. So when you evaporate water, what is removed is pure water and the solutes stay in the lake.

NUBEL: Where did the data that was input into the model come from?

JOHNSON: So a variety of locations. The -- the pit wall runoff components and the hydraulic components were described by Christine. The chemistry came from the -- from groundwater came from the wells. And then for the pit wall runoff, it came from lab -- results from laboratory testing of the site-specific materials.

NUBEL: Did you find that generally a significant amount of data was gathered for the Mount Hope project?

JOHNSON: Yes.

NUBEL: Why?

JOHNSON: So you have to look at each site individually, and when you begin collecting data like Matt described, at the bottom of the pyramid you start with really cheap and lots of it. So lots of cheap tests, because you want to do a whole scatter of them, as many as you can, early on to get an idea of what's going on.

So as you continue up that pyramid, the tests get much more expensive, right? So you do fewer of them, but you only need fewer because you've learned the basics from the bottom of the pyramid. So you start building an understanding. And if you -- if you see that there are a -- a wide variety of rock types or you get a big scatter of results from a particular rock type, then you focus on that rock type to do more sampling of that particular one.

So you allow the data from the site to kind of tell you how to proceed in a phased approach. And that is standard practice worldwide on how you approach sampling and analysis of these kinds of systems where you start off with a broad brush, and you continue to hone in a phased approach, understanding where the variability is. And that's documented in Mende and GAR Guide and well-established guidelines for geochemistry.

NUBEL: Do you find utility in looking at other molybdenum -- molybdenum mines in determining what geochemistry will be at this site?

JOHNSON: Maybe on day one. So on day one, if I'm introduced to a project, I might ask well, what kind of deposit is it? And they'll say well, it's a moly, it's a -- it's a porphyry deposit. And then -- and then I move on from there. So that's just the very beginning of what we look for. It just provides me some -- some background. Like, there's carlin-type deposits, and high sulphidation deposits, skarn deposits. And those are just kind of key words to let me get started, to get my juices flowing. Oh, it's a skarn. So then we go to the next step.

But immediately we start collecting site-specific data. And -- and the fact that it's a moly mine or a porphyry mine basically goes away at that point, because we're going to rely on site-specific test data.

NUBEL: Once you get site-specific data, then looking at other molybdenum mines across the state or country becomes far less relevant?

JOHNSON: Correct.

NUBEL: What did the results of the pit lake geochemistry model show as far as expected water quality?

JOHNSON: So there are dozens and dozens of these graphs. I'm going to spare you and try to just get -- I'll give you the flavor of it with two of them. These are two -- two graphs from the geochemistry -- or, sorry, from the pit lake report, NDEP 342 and NDEP 344. I just put up sulphate and pH -- and first, let me get my pointer here. So along the bottom are the number of years that were simulated, and along the left-hand axis is the constituent of concern.

So in this case, we're looking at the pH. And each of these is a predicted value through time of the -- of the evolving pit lake. Now the -- the blue diamond represents what we call the base case. So we run what we would call the expected case or the most likely outcome, and that's our starting point. And then we also ran a fairly significant number of sensitivity runs, on the order of 30 total, including hydro -- hydrologic as well as geochemical to provide a range of potential outcomes based on -- on uncertainly -- uncertainty in some of the parameters.

So we know there's some uncertainty in some of these values as have been pointed out by commenters. To account for that, we -- we developed many sensitivity runs to look at the effect of that uncertainty on the model outcomes.

And -- and here, this is kind of what we call a box and whisker, so kind of a little box which is the base case, and then we have the whiskers, which represent the -- the extent or the range of output from the model based on all of the sensitivities.

NUBEL: And if you look at NDEP 342 on the left there, I see red lines on the bottom and the top; what do those represent?

JOHNSON: So the red lines represent the Nevada reference standards. In the case of pH, we have two; it's the only one we have two for. We have a high pH standard and a low pH reference standard. And this -- the predicted values don't exceed the high one, nor are they lower than the low one; so those would called in compliance.

For the sulphate, you see the sulphate increasing through time. The standard is 500 milligrams per liter, which is off the scale on top. And the gradual increase through time representing, especially late time, this is the evaporative concentration portion. So when you get -- the lake fills, then the late-time simulations really are just looking at evaporation because nothing else really is going on at that point. There's a little bit of pit wall runoff from rain, but the major driver in late-time pit lakes are evaporation.

And so as you evaporate the water out of the pit, the concentrations gradually climb, just like if you went to the beach and grabbed a pan of water out of the sea and you put it on the stove. Fresh water is evaporated off and you get a -- a higher and higher concentrations (indiscernible).

NUBEL: Did any chemicals exceed Nevada's reference standards?

JOHNSON: Yes. It was -- it was not predicted to be drinking water. It was -- it actually exceeded standards in cadmium and fluoride for the Profile III standards, which is what we use today. At the time, Profile III standards didn't exist; and there were several other metals that exceeded the standards at that time, I think including manganese -- manganese, cadmium, fluoride, I think that was it.

NUBEL: Okay. Did you perform a sensitivity analysis for the geochemical modeling?

JOHNSON: Yeah, and I have kind of touched on that already. And -- and so then we did the geochemistry sensitivity analysis on a variety of parameters because we -- we can come pretty close on some things as inputs, but other things, we know that there's some variability, and we know that there's some uncertainty. So to capture that, we deliberately input, say, higher and lower values from the base case to see what effect that uncertainty has on our -- on our predicted concentrations.

NUBEL: Are you familiar with this image, which I will identify as NDEP-326?

JOHNSON: Yes.

NUBEL: What does it show?

JOHNSON: This -- this table came right from the Schlumberger report. And this is just a summary of the various geochemical modeling sensitivity runs. Christine went through the hydrologic, which were also incorporated into our -- but from a strictly geochemistry standpoint, we wanted to look at a variety of sensitivities, including pit well runoff scaling, pit well submergents.

And these are technical jargoning terms, but at the end of the day, these are increasing and decreasing the amount of chemical mass that is entering the pit and to the pit lake. And that's what we want to test. And so we included looking at groundwater chemistry data that was actually -- for the high one, we selected the worst-case scenario for the water quality for groundwater and used that for a hundred percent of the water coming into the pit from groundwater. So those are just some examples of the sensitivities.

NUBEL: Did the overall geochemical nature of the pit lake remain consistent?

JOHNSON: Generally -- generally consistent. You could see the effect of the sensitivity runs. Obviously, you know, if you have higher evaporation, the concentrations will reflect that higher concentrations. But in general, it didn't result in significant other exceedances of (indiscernible) reference standards.

NUBEL: Are you familiar with some of Great Basin Resource Watch's concerns regarding the Mount

Hope Project?

JOHNSON: Yes.

NUBEL: And how are you familiar with those concerns?

JOHNSON: Through the briefs and the comment letters from Great Basin.

NUBEL: One of those concerns is related to the assumed thickness of the damaged rock zone, right?

JOHNSON: Correct. Did you have a follow-up question?

NUBEL: I do. I'm thinking about if it's been mentioned today, if we've discussed the damaged rock zone.

UN-ID'D: I think it's in the appeal.

NUBEL: Yes, it is contained in the briefs, but there hasn't been -- okay. Okay.

UN-ID'D: Just once.

NUBEL: Yeah, we'll just go over it.

Specifically, Great Basin Resource Watch stated that the assumed thickness of the damaged rock zone in the pit walls, pit lake model is lower than measured in other hard rock metal mines by a factor of 360 percent to 850 percent, correct?

JOHNSON: Yes.

NUBEL: Will you please tell me what damaged rock zone is?

JOHNSON: The damaged rock zone, as is defined and the way that we use it specifically in pit lake modeling, is the amount of material in the pit wall that has been broken up.

So the pit walls are almost always excavated by blasting. And so they drill a hole and they shove a bunch of ANFO in or other explosive, and the explosion pushes material into the pit and also results in pit wall. Now, depending on how good you are at blasting, how hard the rock is, a variety of other components, that broken zone can vary significantly; not only in thickness, but in character.

The damaged rock zone that is of interest to pit lake studies, and this is very important, really relates to this picture down in the lower right-hand corner. I just drew this block here. Call it a one-by-one-foot block, and it has six square feet of surface area. So if you add up the surface area on all six sides of this, it will be six square feet.

Now, metallurgists know that if you break the rock up, it becomes much more reactive. And so a broken-up rock will have a lot more surface area. So that surface area is very important, and the zone of damaged rock zone is what I call the rubblized zone, also is -- ranges anywhere from zero inches to many feet into the pit wall. The damage from blasting can propagate much further.

And I think this may be where some of the confusion is in the way that I use it versus the way that it was commented on by Great Basin, is that ninety-nine percent of the literature -- don't quote me on the 99 -- but the vast majority of literature, when you're looking at damaged pit walls, is from rock mechanics and blasting (indiscernible). So if you Google it, everything I ever saw came from, say, rock mechanics and engineering as (indiscernible) stability.

They're very concerned with something that's very different from what I'm concerned with. They're concerned with how maybe a stress fracture is going to lead to a slope fail, and that can propagate a significant way into the pit wall. Blasting practices are getting much better these days so it's becoming less of an issue. They want a very nice, solid pit wall, so they don't over-blast when they're at final -- the final stages of each level, typically.

But what I'm concerned with is where there's a lot of surface area exposed, so where it's really rubblized. That's where the water/rock interaction will have the greatest effect on the pit.

NUBEL: Did you find that part of this concern was addressed by the sensitivity analysis?

JOHNSON: Yes. So the whole purpose of the sensitivity is this uncertainty. We don't really know how thick the damaged rock zone is. We can estimate it.

I've been in hundreds of pits, and rarely do I see a situation where I would expect the damaged rock zone that I'm concerned with exceeding feet to maybe a couple of meters back. At that point, the rock becomes much more intact and there's virtually no surface area that plays a part in the reactions that I'm interested in seeing.

NUBEL: Okay. And did you review the three red flags discussed in Great Basin Resource Watch's brief in this case?

JOHNSON: Yes.

NUBEL: So red flag number one stated that the model prediction for the pit lake compensation thus depends on the first flush composition measured in humidity cells. How do you -- what is your understanding of that concern?

JOHNSON: So -- and then Mr. Kempton described it as average conditions, but I'll just -- I'll set the record straight, exactly what we did. Humidity cell tests, there's a picture of them. They're just little cylinders, but they crush the rock up really fine. I mean, it's minus three-eights or minus a quarter inch grain size and below. And so that is the main source.

So you've heard us describe -- various people describe what humidity cell tests do. So the water that comes out represents water quality from a crushed sample, right? So it's more concentrated than what we would expect to get in the field. And there are several pages in the geochemistry report -- do we have to cite that exhibit on that, because it's worth looking at -- where the vast -- well, there's citations of -- it's a literature survey of the scaling of fine grain material in the lab to coarse grain material in the field. And the reason for the discrepancy is because of the much higher amount of surface area in the lab, in these crushed samples, compared to what we would find in the field.

And the literature survey says that I could take the concentration from this humidity cell and divide it by a thousand or 10,000 times, a hundred times. So two to six orders of mag -- I'm sorry, two to five orders of magnitude difference because of the surface area and the reaction rates that are typically found in the lab compared to the field.

Now, did we do that? Did we divide the -- say we had a sulfate concentration of a thousand come out of a humidity cell test. Did we divide that by 10,000? No, we didn't. But that's what's recommended.

What Great Basin comments on is not only should we not scale it down 10,000 times, but we should scale them up, roughly, 3,000 times. The opposite direction. So we have a disconnect here of six orders of magnitude. It's a huge deal, right?

So typically, what I like to do in these models is use a scaled -- a very slightly scaled -- in this case, we only scaled by, like, .3 percent, .3 or to thirty-three percent down. Based on just the difference in surface area alone. That's all. We didn't account for any of the -- any of the difference in reaction rates that we could have taken advantage of according to the literature.

So -- and then in our -- I'm sorry this is longwinded, I'm almost done.

In our sensitivity runs, we also run an unscaled chemistry. So it's completely unscaled, so not up or down. So it's exactly what comes out of the humidity cells and we run that through the moler (phonetic). Gives us a good idea of just what that encompasses, what the results are, what the sensitivities are. It turned out not to be very sensitive.

NUBEL: So do you find this concern to be legitimate?

JOHNSON: That we use -- sorry, I kind of swayed off topic. So the concern was that we use only first flush. So that's actually another question. We didn't use just first flush.

So first flush, again, is like this -- this data right at the beginning. So, again, this is the weeks of the humidity cell. Zero through 70, a few of them went further. This is just the sum of the concentrations of all their main metals that came out of each week, you analyze it, you get a concentration.

And so you can see early time, we get higher concentrations typically and they level out through the course of this humidity cell. This one actually goes back up, this red one, for example. And that one is because that's a PAG sample. So the potentially acid generating samples, actually late time is the much more aggressive solution, because they start generating acid and the sulfate goes up and the metals start (indiscernible) out and the concentrations go up.

And so we use not only the early time -- so in our model, the sensitivity run, we took an average, let's say, humidity cell one represented rock type A. And we took an average of all of these values throughout the time period. That's the base case. We also did where we just focused on the first four weeks of data where the concentrations are highest in a lot of these cells and we ran the model called the first flush chemistry.

And then we also took the late type data, because, in theory, the PAG samples, that would be the worst-case scenario for a PAG sample, would be taking the late-time data, applying that chemistry to the flux of water that it represented. And that ends up in the pit lake.

And so we didn't just run average and we didn't just run early time. We also ran the late time, which represents the long-term PAG conditions.

NUBEL: Okay. The second red flag, according to Great Basin Resource Watch, was that the model does not explicitly incorporate the duration that wall rock is exposed to the atmosphere and associated amounts of sulfide that oxidized when it estimates solute leaching wall rock. So could you please provide your scientific interpretation of that comment?

JOHNSON: So the timing that the pit walls are exposed does absolutely affect how those are rinsed through time. The need to simulate that is -- in our model, we make a couple of assumptions that are very important that basically negate the need to do this. So there's two reasons to do this, and I'm going to try to focus on one in particular, and if I miss the point, I hope Great Basin will ask the question in cross.

But my take on this is that the key to this is you look at how much pyrite oxidizes through time, is what their point was, and then you incorporate that into the model.

In our scenario, we used the actual data from the lab that represents the oxidizing PAG sample. So the worst case of the PAG samples, late-time humidity cells, we used that instead of trying to model the oxidation explicitly, which is quite an academic exercise. I mean, we can do it, and I've done it before in models, and it doesn't add value, doesn't provide any more accuracy than using say, for example, this late-time humidity cell test results.

NUBEL: Okay. And the last red flag is that Great Basin Resource Watch says there's no indication that the model tracks mass balance of sulfide minerals in well rock?

JOHNSON: Yeah. I think I understand exactly what this is referring to. Again, if I miss it, please ask.

So sulfide minerals like pyrite, fool's gold, as is -- tends to deplete through time. So if you're oxidizing it, it goes away gradually. And tracking that mass is what they're referring to here.

I just assume in our model that we have an infinite amount of pyrite that is always available and I don't put a limit on how much sulfide is available. So the late-time geochemistry results from the humidity cell tests represent that worst-case scenario and then just allow it to continue at that rate for the entire (Indiscernible) scenario. So I don't -- it's a conservative assumption, I'm assuming that it never runs out, and so I think that it maybe is not relevant to our study.

NUBEL: Okay. And lastly, I just want to have you address head on, were you present for Mr. Kempton's testimony?

JOHNSON: Yes.

NUBEL: And he discussed a big error, is what he called it, in the study that you completed?

JOHNSON: Yes.

NUBEL: And he said, and I apologize if you covered this in some of your testimony already, that it was related to the duration over which wall rock is exposed, right?

JOHNSON: Yeah.

NUBEL: And I think part of that is incorporated into the red flags, correct?

JOHNSON: It is, actually. I think -- I think I got all of those, maybe be considered the red flags and then the fatal error model, which I don't believe exists. If I can be pointed more directly to, maybe I missed the explanation, cross-examine? Yeah.

NUBEL: Okay. But you didn't find any validity in the big error (indiscernible)?

JOHNSON: No.
NUBEL: Okay. Those are the questions I have.
UN-ID'D: Okay.
CAVANAUGHBILL: So, Mr. Johnson, how long have you been working on pit lakes, you said?
JOHNSON: I probably did my first one second year, so 23 years.
CAVANAUGHBILL: Have you ever seen a pit lake that was modeled accurately?
JOHNSON: Do you want a yes or no or do you want a little more detail?
CAVANAUGHBILL: A yes or no is fine.
JOHNSON: Yes.
CAVANAUGHBILL: You have? How often?
JOHNSON: There aren't very many pit lakes to compare against, so probably of the ones that I've done, I've been -- there -- I'm speculating here. I don't know how many have filled up. Maybe ten percent of the ones that I simulated have water in them now, maybe less, five percent. So the opportunity is not very common.
CAVANAUGHBILL: To find one that was modeled accurately?
JOHNSON: To find any. And then, of those, to find some that I've been to.
CAVANAUGHBILL: And with respect to Mr. Kempton's comment about the error that he found, your response -- your response was not that you didn't agree that you hadn't seen it or hadn't been pointed out to you?

JOHNSON: It's hard to tell, because he -- in the comments, it describes there's a fatal error, and then it goes on to describe, like, between five and ten different things, some of which I couldn't quite tie to that fatal error. So I tried to cover them in my responses here in direct, if I did.
CAVANAUGHBILL: Were you involved in the initial upfront testing? Mr. Kempton was talking about the testing that was done and that it only lasted a one-week period --
JOHNSON: So that's --
CAVANAUGHBILL: -- in the lab?
JOHNSON: To answer your question, no, I was not directly involved.
CAVANAUGHBILL: Okay.
JOHNSON: But the tests ran a lot longer than one week. They ran between 57 and 72 (indiscernible).
CAVANAUGHBILL: Well, that was the one, the kinetic testing, right?
JOHNSON: Correct. And that's what the model is based on.
CAVANAUGHBILL: And can you point out in your report where that's reflected? I believe it's Exhibit Number 9.
JOHNSON: Where what is reflected?
CAVANAUGHBILL: Where the testing, the length of the testing.
JOHNSON: So the SRK report -- so SRK was in charge of all the water -- waste characterization work. So in their report, all of their graphs, there's, like, dozens of graphs in their report, all of them

have weeks along the bottom. And they will describe the testing in their report in detail, and the graphs all show the number of weeks is 52 or seventy (indiscernible).

CAVANAUGHBILL: I have nothing further at this time.

UN-ID'D: (Indiscernible) you guys.

GANS: Kathryn?

MS. LANDRETH: I'll pass for the moment.

PORTA: Okay. So earlier we heard from Great Basin's witness, this model that you use, is it similar to the Rhine model that's been described, or modified over the years?

JOHNSON: It is a Rhine model, yeah.

PORTA: Variation for that? Okay. And correct me if I'm wrong. From your testimony, it sounds as though, when we look at the humidity cell test, we're looking at worse case scenarios because of the fracturing of the -- having a larger surface area than will actually show up in the pit years down the road. So the rates of decompensation or flushing with the crushed rock will be much greater. So again, it's a worst-case scenario, per se?

JOHNSON: Yes.

PORTA: Okay. Except for the PAG, where that worst-case scenario was ran out weeks later, and those numbers were used where the material started to show more acid generating because of time.

JOHNSON: Correct.
PORTA: Versus the rock wall, that's more of an instant flush, is the worst-case scenario?
JOHNSON: Yes.
PORTA: And so you used those two worst case scenarios per se in your model?
JOHNSON: Correct.
PORTA: Okay. I just want to make sure I got that right. I think that's -- go ahead.
GANS: Just a clarification. You said that precipitation is really clean water. But it also flows down the rock walls too, doesn't it?
JOHNSON: Yes, yes.
GANS: Does it does have an effect?
JOHNSON: So the direct precipitation falls directly on the lake only.
GANS: Okay. So you're talking director pre --
JOHNSON: Yeah. So those are two different sources to the lake.
GANS: Okay. Did you take in consideration the part of that that comes down the rock walls?
JOHNSON: Absolutely, yes. So every time step -- so the lake will start filling up the pit. And then there's some exposed area, the pit wall above the lake. And we simulate the amount of precipitation that hits that pit wall, so we know how much rain is there, we know what the area is, so we can calculate a volume of -- that lands on

the pit wall. And we actually figure out how much of it lands on every single different rock type that's exposed to the atmosphere at that time step. So time step 50, the lake is here. We calculate how much exposure there is of every different rock type, and each of those rock types we have a humidity cell test or more than one that represent that rock type. So we do a weighted average of the pit wall area and the total volume of water to come up with a chemistry of that pit call run off that runs into the lake. Does that make sense?

PORTA: And that was like of the PAG material was sixteen percent of the total surface of the area above the groundwater and there was no PAG area underneath the maximum water level that the pit lake --

JOHNSON: Not very much. It was mostly -- and of course that sixteen percent changes through time, right?

PORTA: Yeah, as it erodes.

JOHNSON: Roughly of the entire pit it's sixteen percent, but as the pit lake fills, you know, the proportions change slightly. But you're right, it's roughly sixteen percent.

PORTA: Okay.

GANS: You work for NDEP?

JOHNSON: No. I'm an independent consultant.

GANS: Okay. Hired by NDEP? Or hired by who, and why are you here?

JOHNSON: Okay, that's a good question. So I originally directed the study for Schlumberger when I worked at Schlumberger Water Services. So I wrote the report, I did a lot of the model. But then -- so that was for Eureka Moly. And Eureka Moly, I was one of their consultants. Now, since -- for this particular project or for this particular phase of work, I'm hired by General Moly to represent my work that was submitted to NDEP that was the source of their bases for their permit. Kind of complicated.

GANS: So -- and I'm saying this tongue in cheek. So you're really suspect.

JOHNSON: Absolutely.

GANS: So given that, and your attitude that when you work something for somebody, you give them the bad news as well as the good news. You're not trying to --

JOHNSON: Okay.

GANS: So tell us, what was some of the bad news that you gave either Moly or NDEP when you're working on them, when you're doing this?

JOHNSON: To be fair, I run the models the best I can and predict the pit lake water quality, and that moves on then from my venue. That goes -- so I don't know who did the SLERA in this case. Was it SRK? So my numbers went to SRK so they could do the SLERA, which is the screening level ecological risk assessment on those numbers. And they are what they are.

And so the bad news was that water quality standards were exceeded for several constituents. And the good news is, is it's a hydraulic sink. So I could tell General Moly that the bad news is we have exceedances of water quality standards in the pit. I don't know what that will do in the SLERA. Good news is, it's a hydraulic sink, so there's not going to be any off-site effects. So really, all you're looking at is ecological risk in this case when you have a sink.

NUBEL: Just to clarify, when you say hydraulic sink, we've been referring to it as a terminal sink?

JOHNSON: Terminal sink.

NUBEL: Is that the same thing?

JOHNSON: Yeah, same.

GANS: So what I'm getting from what you're saying, this hydraulic sink is a good thing?

JOHNSON: Yes.

GANS: Why?

JOHNSON: Because then you really only have to worry about ecologic risk. You know, birds fly over, they land on the lake. Do they keel over and salt up or do they drink some and move on?

There's no offsite impact. So water, once it's -- even if it exceeds water quality standards in the pit, it doesn't migrate away from the pit. It doesn't go anywhere. It just stays there. And it does gradually get worse through time because of evaporation. But because it's a terminal sink, it doesn't move into groundwaters of the state. So that issue goes away. The only issue then is animals and, you know, ecological intoxicity and risk associated with the bunnies and mallards and mule deer and cattle.

GANS: So -- and, again, I'm being facetious, but I want to make a point. It gets worse over time?

JOHNSON: Yes.

GANS: What's that mean? It turns red after a while?

JOHNSON: So it's a complicated question that you just asked. If you were to look at -- I'll try to keep it to like a minute or two. If you were to look at certain constituents in the lake and it continues to evaporate 500 years, 1,000 years, whatever, chloride is a good constituent to look at. Chloride, very unreactive. It doesn't -- doesn't react away, it doesn't go away. It just stays there in its current state.

So you can see the chloride trend in the model that I put together between 150 years and 200 years, that time step, in the late time of my model, that slope of chloride is the slope of which all other constituents will tend to increase. And that's what I wanted to find out. So I run the model into this evaporative controlled state so that I can see what the evaporation effect is going to be. And so can anyone in the room. They can go and say, well, that increased ten milligrams per liter over fifty percent so we know that's going to keep going, and so will the others.

The complicated part is that not everything is chloride. And so a lot of constituents do not behave conservatively like chloride does. There's a lot of reactions that occur. So they might be limited. At a certain point, you know, for example, sulfate will level out, probably around 1,200 or 1,500 milligrams per liter because, at that point, it starts precipitating out gypsum if there's enough calcium in the water. So then the concentration of some of these is controlled by other reactions, so they won't continue to. Some will, some won't.

GANS: So at the end of 200 years, none of us will be here, what are we going to see in that pit?

JOHNSON: You can look at my report and see. Well, the chemistry?

GANS: Yeah.

JOHNSON: So there's exceedances of -- when I say exceedances, I mean the Nevada Reference Standards for manganese, cadmium, and fluoride.

I feel like I'm forgetting one, but -- there might be four. But they're exceedances. So they're -- in some cases, they're just barely creeping up over those, and fluoride actually will level out because we know, in other pit lakes, we see that chloride is controlled by fluorite mineral reaction. So it will level out. Manganese may continue, and cadmium kind of depends. Cadmium's a difficult one to predict sometimes. So -- but you can be assured that, most likely, there will be some exceedances of water quality standards in the lake.

GANS: And an exceedance, I understand. So that -- and again, I'm trying to put this in my own perspective. Does an exceedance mean that it's going to be poison water?

JOHNSON: Toxicity depends on dose, so how much you drink.

GANS: (No verbal response)

JOHNSON: Or exposure, so absorption through the skin. You know, they've got all -- there's a --

GANS: Yes.

JOHNSON: -- a whole field of science-related toxicology and uptake of the -- the metals, in this case, cadmium, fluoride -- fluoride -- it has a taste issue and it messes with your teeth. There's also some organ issues, but it depends on how much you drink and how much gets absorbed through the skin. So there are various pathways into your body. But there's a whole field of science. I'm not very good at it. I understand it enough.

And that's why we pass the chemistry that I predict on to someone who does an ecological risk, which is all this toxicity-based exposure. And then they come up with hazard portions for a representative critter, usually, whether it's a mallard -- is a good one, or cattle, or deer. And then they -- they look at the most likely outcomes of exposure to what they might encounter if they were to drink the water or get it on them or -- that -- but that -- and then, that's with the SLERA. That's their job, is to see if there is ecological risks associated with it.

GANS: Since you did this work, and one of the things we've been hearing in testimony today and before is that there was -- it seems to be that whatever we predicted turned out to be much worse than what we predicted. I heard that.

JOHNSON: In some -- in some cases, yes. That's correct.

GANS: Why? I mean, if we know that, then it gives credence to what Great Basin is saying, is we need to look at this and make sure that whatever we predict, it's not going to be greatly worse than what we predict. It might be where -- right around where we predict, like that little, what'd you say? The little bar was?

JOHNSON: Box and whisker.

GANS: Yes.
JOHNSON: Yes.
GANS: And I understand that, you know. But what I'm hearing is it's going to be much worse. Those whiskers are way out there somewhere. I don't know if that's true or not. That's just the perception I'm getting. But it seems to be very, very important, as I listen to Great Basin. And I think they have credibility. It sounds to me like you don't give it that much credence.
JOHNSON: To what, in particular?
GANS: The fact that we predict something, but it's much worse.
JOHNSON: Can I respond?
GANS: Sure.
JOHNSON: So it's easy to cherry pick the worst pit lakes in the world. Right? I can go out to the internet and type in horriblepitlake.com, right? Then we can find the bad actors. There are a lot of pits and -- and I've worked on a lot of them. And they're not all that bad. And they're not all mis-predicted.

And the Rhine (phonetic) model is -- it works, I would say, very well. It's the state of the art. It's what is used. Now, how you use it, it can be misused. So if you don't design your model effectively, or you don't explore the uncertainty adequately, then, yeah, I think you're remiss in your duties. You need to look at the uncertainties that are -- you're faced with and account for those in your model, which -- which we have done. And that's what those whiskers are.

Now in some cases, the whiskers are much bigger because the uncertainty is greater. And -- and that needs to be reflected in the work that -- that you do. But in other cases, models are very insensitive to changes. So it does run the gamut. I have done models that actually work and that are not, you know, out to lunch. And the -- the Rhine model, used effectively, does work.

GANS: So on this case, the Rhine model was used?

JOHNSON: Yes.

GANS: And you have that use of what you're predicting now with that model -- what's being predicted. I'm not blaming you for anything. And you have experience in other pit lakes. So what could you tell us about your opinions relating to what we're being told by Great Basin?

First, what we're being told by the State because we're between a rock and a hard place up here, listening to the State, listening to the Appellate.

What is your opinion between those two positions that we've heard in this appeal?

JOHNSON: So I think Houston said we're getting better at this all the time. And we are. And we do have a state of the art. And that is the Rhine model. That's what we use. And -- and we try to use it effectively so that we can prepare our clients and the agencies for -- for the issues that might arise. For example, if they have excessive amounts of fluoride in them, we can prepare for that. Then, we do the best we can with that tool.

Are there other tools that are better? Not right now. Dr. Miller described, you know, there are other things we want to incorporate into our pits. And I agree with that. I'm constantly trying to improve.

Now, where we come in between the agencies and Great Basin, you know, the model that I developed is in the middle, frankly. I mean, it -- it -- the experts would allow me a lot more latitude to decrease the concentrations based on scale. So based on what others have studied in the lab, compared to field, I could've done even up to a thousand times even more dilute. I know that that wouldn't have been realistic.

Going the other direction is also not realistic, in my opinion. I think that those reaction rates that were presented in the comments are -- are also excessively high. So where we landed was very much in the middle. And along with the sensitivity analysis that I ran, gave us the range of values that should give us comfort, at least for now, based on what we know now -- that the pit lake, whilst it's not drinking water, does have some problems. But it's not going to be acidic.

GANS: So I'm probably asking you, as the expert here, the wrong question, but what's wrong with what Great Basin wants to do when they say, let's get another outside opinion -- another expert opinion? Is there something wrong with doing that or is it going to show us something much different than what we already have, in your opinion? What are your opinion of that approach?

JOHNSON: Well, part of what -- I'm always interested in getting my work reviewed by someone, hopefully, I can find better than me at what I try to do good.

So Andrew Nicholson (phonetic), as was brought up earlier, we asked that he review everything that we did. And Andrew Nicholson is a very well-respected -- he's way smarter than me. And -- and that's what I like. I want people to point out the problem.

So a peer review is a very reasonable approach to take. I mean, I would -- I would hesitate to do any significant piece of work without one. But that's why we engaged Dr.

Nicholson to review the model from soup to nuts. And he came back with some very good --

CAVANAUGHBILL: I'm going to object to hearsay. Dr. Nicholson's not here and we haven't seen any of these reviews, so.

GANS: Okay. I -- that's reasonable.

JOHNSON: I -- I think the reviews are in the documents. So -- in front of the -- the reports. So you can look at them there. I mean, if it's --

GANS: Your comment, though, where I'm getting --

JOHNSON: Yeah.

GANS: And Julie, I hope I -- is that this third person or this third review, it's your opinion it's already been done? Is that what you're telling me?

JOHNSON: Yes, it has been done. We engaged Dr. Nicholson during the modeling process to -- well, near the end of the modeling process to get feedback on any problems that he could identify. And his comments and feedback were quite good. And we incorporated his feedback. We actually changed the model based on his comments.

And he -- he doesn't -- he didn't work -- you know, he's not in my office. He worked for a completely different company. I believe he was hired by Eureka Moly, though. But Eureka Moly wanted to make sure --

GANS: Another suspect.

JOHNSON: -- wanted to make sure that my work was up to snuff. So fair enough.

GANS: Okay. Go on.

PORTA: I think you answered the questions. Just to clarify, then, you know, Great Basin has suggested --

UN-ID'D: I asked him to review.

PORTA: -- a cadre of people look at this and review the model to ensure that it's going to give the best predictability possible. But it sounds as though that was done, to some degree, with the review that Dr. Nicholson did. And also, that answers a question, you mentioned, Jim, about the third-party review.

We won't gain any more certainty, it doesn't sound like, with another review. And is that -- would that be accurate, do you feel?

JOHNSON: I think that would be accurate because the model accuracy, there's only a finite set of data, site-specific data. Now, how you -- how you use that data would potentially be changed a little bit, but I don't believe it would be outside of the range that I've already predicted.

PORTA: And do you agree with the Division's position and the permit six months into this after they start excavating to do more testing on materials, as it's coming out of the pit, and then relooking at the model?

JOHNSON: Yeah.

PORTA: Or a five -- in a five-year period, six-month, five years, I think, was the other term.

JOHNSON: Yeah. And that's -- that's common practice, I think. So they -- they'll capture additional data as it's mined. And if you -- especially, if you see something that you didn't expect or something that didn't show up in the first data site, you can say, oh, wait; this is different. And then you definitely want to remodel. If the -- if the data are consistent --

PORTA: Yeah.

JOHNSON: -- with what we've already seen, then I don't see the --

PORTA: Okay. Thanks.

GANS: And in your experience with what Tom was talking about, I've heard the concept used and stated here -- not today. But by that time, the horse is out of the barn. It's too late. Is that true?

JOHNSON: In other words, I think, from the last hearing I -- and Great Basin was describing the -- the horse is out of the barn argument, relates to mining is already in progress.

GANS: Yeah.

JOHNSON: And --

GANS: And I have to give them some credence because I -- that really concerns me. This is an economic endeavor. I mean, why would --

JOHNSON: Yeah.

GANS: -- Moly want to do this if they're not going to make money? And they should.

JOHNSON: Absolutely.

GANS: There's no question.

JOHNSON: Right.

GANS: But I'm just wondering, once the horse is out of the barn, how effective what NDEP wants to do is going to be?

JOHNSON: Well, I think they have to do it, first of all. But to capture that data, especially if there are changes, so that they can prepare for issues that will be coming at them at closure. So -- and though -- every -- I understand -- I -- I think it's every two years or every five years during the mining, their -- their closure plan will be updated.

GANS: Including pits?

JOHNSON: That's standard. I don't know if that's in this particular case -- what's -- what's in the permit, but that's a standard. And so you continue to capture additional hydraulic data. So you -- they'll know, pretty quickly, if the -- if the hydraulics are right. Because they have to dewater. Right. Once they have to dewater, they'll -- they'll suddenly be inundated, no pun intended, with a lot of data. And so they'll be able to refine the groundwater flow model.

Now, from the geochemistry, every day they do a blast, they grab samples of that blast. And they'll send it out. Well, not every blast, but every -- there'll be a defined number of samples they collect per quarter, that go for analysis and (indiscernible). So that they know, as they're mining, if there's any variability. That should also incorporate (indiscernible).

GANS: Kathryn?

LANDRETH: Oh, I just have sort of a couple of clarifications. I get what you're saying about Dr. Nicholson's review he did. But you would agree that that wasn't quite, I think, what the Great Basin folks were looking for when they were talking about somebody mutually agreed upon by all the parties, so that there would be more confidence.

And apparently, they haven't seen the product anyway that Dr. Nicholson produced. But the idea of having somebody that everybody agreed upon and then present -- they were able to present to that person some of the issues that have been raised by Great Basin in this appeal that may not have been thoroughly predicted when you were doing your work.

JOHNSON: (No verbal response). I think that for -- I -- I would defer to NDEP to answer that question.

I -- it's not up to me to -- for them to hire another outside person --

LANDRETH: Uh-huh.

JOHNSON: -- but I liked it. But -- for my -- and it -- and it does add value, I think, to -- to when I'm looking at something pretty (indiscernible). So I -- I guess --

GANS: So your comment is, bring it on?

JOHNSON: I -- what? I'm sorry.

GANS: Your comment is, bring it on.

JOHNSON: Right. Right.

PORTA: And do you feel that there are qualified entities out there that could do this work?

JOHNSON: Emcees?

LANDRETH: Entities.

JOHNSON: Oh, entities?

PORTA: Entities, yeah.

JOHNSON: Oh, abs -- you mean, to do third-party reviews?

PORTA: Yeah.

JOHNSON: Yes.

PORTA: Okay. That are experienced in pit lake mining, pit lakes --

JOHNSON: Yeah, the -- we all know each other.

PORTA: Okay. So it's a small group?

JOHNSON: There's not that many of us.

PORTA: Okay.

JOHNSON: But -- and we go to the conferences and -- but there's a lot of really smart people (indiscernible) are good at this stuff. And they think hard about it, including people in this room. So yes. The answer is yes. There are (indiscernible).

GANS: Anything else?

Okay. Well, thank you very much for your testimony today.

We've reached that point where --

PORTA: Do they have one more?

GANS: Yep.

LANDRETH: One more.

GANS: Oh, you have -- you want -- that's right.

LANDRETH: We have one more.

GANS: Yeah, one more. Oh, I don't want to leave somebody out. Katie will knock me out of this room.

PORTA: This is Katie's witness, too.

ARMSTRONG: And this is my witness.

If we could then call Todd Process to the stand. Thank you.

GANS: My apologies.

ARMSTRONG: It shouldn't take too long.

Okay. Hi, Todd. Can you state and spell your name for the record?

PROCESS: Todd -- T-O-D-D, Process, P-R-O-C-E-S-S.

ARMSTRONG: And you currently work for the Nevada Division of Environmental Protection; is that correct?

PROCESS: Supervisor of Reclamation under the Bureau of

Mining Regulation and Reclamation.
ARMSTRONG: And what is your title again, supervisor?
PROCESS: Reclamation Supervisor.
ARMSTRONG: Okay. And can you describe your responsibilities as the Reclamation Supervisor?
PROCESS: We're overseeing about 257 reclamation permits in the state, making sure that we have all the bonding in place for those permits with BLM or Forest Service or ourselves, ensuring that we have financial assurance for all the properties.
ARMSTRONG: And can you briefly describe your work history with NDEP?
PROCESS: Just completed my 19th year, going into the 20th year. Been -- been a permit writer. I've wrote a lot of the permits. Probably wrote about 50 or 60 permits for mine sites in Nevada.
ARMSTRONG: Okay. I'm going to quickly go over just kind of bonding overview with you. And then we'll hit on the Mount Hope specifics.

So you're familiar with Nevada's mining reclamation regulations; is that correct?
PROCESS: Yeah, 519A. Yep.
ARMSTRONG: And you're familiar with reclamation permits?
PROCESS: Yes, I am.
ARMSTRONG: Could you explain what those are?
PROCESS: It's -- it's really looking at some of the maps that you saw today. And looking at the footprint of the mine, the footprint of the waste raw dump,

the footprint of a pit, other facilities, buildings, foundations; all that gets looked at as a footprint of acreages. Then we assign those acreages into the categories, into the permit. And then we assign bond dollars accordingly.

So an acre of a leach pad is not the same as a acre of a build. So everything gets assi -- assigned a -- a bond amount based upon a category of that mine component.

ARMSTRONG: So as you said, the reclamation permit includes bonding or financial assurance?

PROCESS: Yep.

ARMSTRONG: And can you describe the purpose of Nevada's financial assurity and bonding programs?

PROCESS: It -- it's to assure, really, that we protect waters of the state, is the big mission. But also to make sure that we have enough reclamation assurance set aside so that the taxpayers don't have to pick up a cost of -- of reclaiming the land when they're done. Or taking care of mine impacted waters.

ARMSTRONG: And this happens sometimes because an operator is unable to reclaim the land or unwilling to do so?

PROCESS: If -- if they might -- if there's financial distress or something and they can't -- can't perform, then we have monies set aside to -- to pay a third-party contractor to go in and do reclamation of prop -- of property.

ARMSTRONG: Does NDEP always hold the bond, or do you work in conjunction with BLM?

PROCESS: Most of the projects are mixed land packages, private and public. And so it's an interface of working with the other agencies to determine who's going to hold the bond. The -- the majority of the bonds are held by the State BLM office. We don't hold anything unless it's a majority of private land; then we would hold that in NDEP.

ARMSTRONG: And can you describe when the bonding is actually required?

PROCESS: Prior to shoveling anything. Prior to -- to creating any disturbance. So we -- we look at disturbance acres, and prior to disturbing any acreage, you have to have the bond in place first. Otherwise, your permit's not valid. You have to have the bonding in place with your permit to make it a valid permit to act -- to perform any kind of shovel work.

ARMSTRONG: So the reclamation permit wouldn't be valid if the financial assurance isn't in place?

PROCESS: Right, right.

ARMSTRONG: Got it. Can you explain what would happen if an entity started their project prior to the required bond being posted?

PROCESS: Typically, it would go through a cease and desist (indiscernible) coordinate with BLM, they would

have to stop.
ARMSTRONG: Okay.
PROCESS: If it's -- if it's something -- and we do a lot of inspections. So we're always going out and inspecting the sites to -- making sure what we see in the maps and plans, and go out in the field -- make sure they're following through with what they said they're going to do.
ARMSTRONG: Okay. And can you explain what's covered under a bond?
PROCESS: Well, lots of things. Waste rock facilities, buildings and foundations, tailings facilities. What's really covered in the bond is looking at how we're going to reclaim that land and make it useful for a post-mining land use. And that's the requirement by 519A, is to make that land usable again.
ARMSTRONG: Is the treatment of mine-impacted waters covered under those bonds?
PROCESS: Yeah. Yep. So we --
ARMSTRONG: Okay.
PROCESS: That regulations were changed years ago, but we do have the ability, if regulation determines there's a -- a mine-impacted scenario of water for whatever reasons, from waste rock dump or something, we have the authority to make them bond to clean that situation up.
ARMSTRONG: And can you explain the Nevada Standardized

Reclamation Cost Estimator for us? What that is?

PROCESS: So the -- we -- we look at the mines and we try to standardize the costs for equipment productivity, bringing the equipment to the site to do the reclamation, looking up -- (indiscernible) of the question.

ARMSTRONG: Just to explain what the Nevada Standardized Reclamation Cost Estimator is.

PROCESS: So it's -- it's a model to determine how we assign acres and how we assign the bonding costs of models is very high-end as far as the detail that it goes through to make sure we're covering all the bonding -- the bases of everything in Nevada. But the model is so good that people internationally use it.

ARMSTRONG: And do you mind if I refer to that as the SRCE?

PROCESS: Yeah.

ARMSTRONG: I believe that's what you refer to it as?

PROCESS: Yeah.

ARMSTRONG: Okay. And I think, within that SRCE, there is a cost data file; is that correct?

PROCESS: So the cost data file is reassigned and -- and -- and adjusted for inflation for August 1st of every year. That way, we are always capturing the highest cost of labor and fuel and things like that at the mine site. So we're constantly updating. We're -- we are a little over $3 billion right now in the State of Nevada on bonding. And -- and it's continuing to go up, as we look for inflation of fuel cost, tires, all that stuff that goes into doing reclamations, it's always being adjusted in the SRCE model under a cost analysis file that we do here.

ARMSTRONG: Okay. And is there mobilization and demobilization costs within that SRCE?

PROCESS: Yeah, within that -- well, it's -- it's in the SRCE total summary page, but it's done as a separate entity and that's incorporated into the summary page for total bond. So that way, you know you can pay a third-party contractor and mobilize equipment out to the site and demobilizing it after the reclamation.

So all that -- all those things are considered to make sure that, if someone walks away, we have enough money already put aside to take care of it.

ARMSTRONG: And are those costs ever updated?

PROCESS: Depending on the situation. In -- in this case, this is a -- you know, it can be done yearly, it can be done -- the -- the regulation requires -- 519A requires every three years.

ARMSTRONG: Okay. Can you also explain the Process Fluids Cost Estimator and the heap -- Heap Leach Drain down Estimator?

PROCESS: So we have a couple -- couple. One's for tailings. I think (indiscernible) has tailings.

We have models that determine how the water balances -- what -- how much water is being used at a leach pad or a tailings facility. And we can calculate how -- how long it's going to take to recirculate that water and evaporate that water until -- until you reach a passive state of control of the water. And -- and then -- and when you do the reclamation, you put covers on things and so you're -- you're reducing that water volume to a point of it going to be a passive system. And -- and we bond to do that. So there could be billions of dol -- billions of dollars -- not billions of dollars -- billions of gallons ahead, millions of dollars assigned to take care of that water issue.

ARMSTRONG: And do any of these tools account for indirect costs?

PROCESS: The SRCE model does. And it's usually in the 30- to 40-percent range of indirects. And that's for paying a contractor, profits, and performance bonds, and -- and a number of other things. And -- and it covers some of the unknowns that might come up. Like any construction site, you might have an unknown. So that -- so you have a -- a subtotal, and then you add on another 35 percent on top of that typically. So that it -- for the unknowns and to pay the contractor.

ARMSTRONG: Then are the bonds ever released?

PROCESS: In portions. They're -- they're -- a mine site's never going to be able to walk away and have the bond be zero right away. It's a series of steps. Maybe the -- part of the waste rock dump's over here. And then they go over here and work -- work here. And then they ask for a bond release somewhere else. But we always -- they have to file paperwork with us. We go and do a site inspection. We validate the -- the re-sloping of the waste rock dumps are done, that the covers been put on, that the vegetation is successful, and then we release the bond. And then we work in coordination with BLM or the Forest Service. Who's ever holding the bond, we work through that together.

ARMSTRONG: And you had motioned that the SRCE is an international model? Did you say that?

PROCESS: They just use a metric version of it, but it's -- it's doing the same thing. It's using mathematical and calculations to -- to take measurements and topography and how to adjust that and calculate the cost to reclaim.

ARMSTRONG: Okay. And is Nevada's model successful?

PROCESS: Yeah. Well, I -- we have great examples of what's happening. I think -- I think we're -- in my personal opinion, I -- I think we're leading -- we're the most progressive leading the world right now.

ARMSTRONG: Great. So now I'm going to move on to Mount Hope. Are you familiar with the Mount Hope site?
PROCESS: You know, I didn't write the permit. I mean, I have a permit writer who -- who's assigned to -- to reviewing it and she feeds the information to me. So I didn't write the original permit, but I'm familiar with the property and where it's at, and some of the facilities that are proposed, yeah.
ARMSTRONG: Okay. And you're familiar with it because you are the supervisor --
PROCESS: Yeah.
ARMSTRONG: -- of the --
PROCESS: Yep.
ARMSTRONG: -- branch? Do you know what the current bonding amount for the Mount Hope facility is?
PROCESS: A little over -- a little over 3 million -- 3,093,000, something in that range.
ARMSTRONG: And who holds that bond?
PROCESS: BLM does.
ARMSTRONG: Okay. And do you know what that covers, the three million?
PROCESS: It -- you know, just -- they really -- they've grubbed out a large area for the pit and for, I think, a tailings facility and some other areas where they grubbed out the vegetation. So that bond really just reflects some access roads and culverts maybe. And -- and reseeding that land.

ARMSTRONG: So the three million doesn't reflect an actual operating mine?
PROCESS: No, no.
ARMSTRONG: Okay. When it does become an actual operating mine, will the bond be reevaluated?
PROCESS: They would have to propose something to us to modify the current status of the permit to proceed and have the bond in place. So if they wanted to put a building in or a tailings facility, they would have to put those bond dollars -- we'd have to go through a -- a modification to the existing permit and how it stands. And say, "What do you want to build now?" Then we'd assign bond dollars to that before construction could begin.
ARMSTRONG: So additional bonding is a possibility --
PROCESS: Oh, yeah. Always. Yeah.
ARMSTRONG: -- in the future of the project?
PROCESS: It'd have to be. We -- right now, they're saying that they can't proceed without doing it.
ARMSTRONG: Does the current bond amount of approximately three million cover fluid management costs associated with the proposed delay?
PROCESS: No. No.
ARMSTRONG: Prior to the actual mining of the pit, what will be -- need to be reevaluated for the bond? Can you --
PROCESS: Just what -- what facilities they want to

construct. You know? The -- it's -- it doesn't -- there's -- I do know that the permit's phased. It's a phased approach. They're not going to -- there's no possible way to build this entire mine site in one year or five years. It's a series of steps that are going to happen over time. And so you're going to do this this year, we're going to bond for that. And you're going to do this next year, and we're going to bond for that. Ideally, I tell the operator, tell me what you want to do in the next three years. Let's bond it all at one time and save ourselves the administrative hassle.

But that's the idea, is I -- you know, tell us what you're thinking of doing, what you want to do, what facilities you're going to build, and then we're going to bond for it.

ARMSTRONG: So will you look at the site of the pit lake?

PROCESS: I -- you know, the pit -- there's not a lot of money assigned to actual -- a pit lake or a pit itself.

ARMSTRONG: And what about --

PROCESS: The safety (indiscernible).

ARMSTRONG: Okay. What about the pit lake chemistry?

PROCESS: That's really determined by regulation and people that -- we -- we don't look at the pit lake chemistries, per se.

ARMSTRONG: Do you know if your -- if the understanding of the pit lake chemistry changes, will the bonding be reevaluated?

PROCESS: Initially, we probably don't have anything until we know that there has some -- if -- if there's a determinate of a mitigation factor that has to be done, then I do have the authority to make a bond to (indiscernible). Yeah.

ARMSTRONG: Okay. Do you know what the anticipated bond is for the project we're talking about today with the pit lake?

PROCESS: I don't know if there's pit lake water treatment assigned. Right -- I don't think there is. But I'm -- and I certainly believe that we'd be at a 125 million to $150 million dollars of bond money.

ARMSTRONG: So --

PROCESS: For the -- for the entire site.

ARMSTRONG: You just said 125 to 150 million?

PROCESS: Yeah, yeah.

ARMSTRONG: For the projected bonding amount for this project to go forward?

PROCESS: If -- if you were to fully build everything out at one -- you know, at one time.

ARMSTRONG: To put everything in.

PROCESS: But like I said, it's -- it's --

ARMSTRONG: Okay.

PROCESS: -- going to be different (indiscernible) steps.

ARMSTRONG: And this amount would be calculated by the SRCE?

PROCESS: Yeah, yeah.
ARMSTRONG: The amount would be calculated by the SRCE?
PROCESS: Right.
ARMSTRONG: And must the additional bonding of approximately 120 to 150 million be posted prior to mining of the pit?
PROCESS: Yep. Well, it depends. Like I said, it depends on the sequence. And --
ARMSTRONG: Sure.
PROCESS: -- obviously, the pit's going to be the first thing you start digging, right? One of the first things.
ARMSTRONG: Sure.
PROCESS: But you still get process buildings and tailings built. You can't just dig the pit and -- and be able to process anything because you don't have any facilities built. So you got to think years ahead of what -- where you'll be at financing and what your guys are -- build and construct.
ARMSTRONG: Okay. After mine closure, will there be -- will there be any requirements for Eureka Moly at this site?
PROCESS: Say -- say the first part.
ARMSTRONG: After the mine closes, will there be requirements in place for Eureka Moly?
PROCESS: Well, there's a post -- there's five years of monitoring costs that are built into the SRCE model for water quality. There's three years of

vegetation monitoring after the mine closes. There -- there's other things that are -- even though we're done and not operating, there's still going to be some dollars hanging out there for a while until -- until the vegetation comes in, until all the mine-impacted water issues are taken care of, all that sort of thing.

ARMSTRONG: And would they be required to provide BLM with assurity for long-term monitoring and maintenance after mine closure?

PROCESS: If that's determined to be needed, yeah.

ARMSTRONG: And can you describe what that would entail?

PROCESS: You might have a -- some ponds that are capturing, you know, im -- mine-impacted water into evaporation cells.

PROCESS: evaporation cells and then they think -- well, and we know there's studies and things out there they last maybe 50 to 75 years and that operation and maintenance of some of those facilities we put into a long-term trust mechanism for the State BLM office, and we would help them determine what that -- what's covering that, and then the operator has to put some money into a fund so that when that money is needed to replace those ponds, that money has grown over time to account for that need to replace that pond.

ARMSTRONG: So some of this long-term monitoring could include groundwater monitoring?

PROCESS: Yeah.
ARMSTRONG: And, like, pit lake water sample costs?
PROCESS: Yeah.
ARMSTRONG: Fencing maintenance?
PROCESS: Sorry?
ARMSTRONG: Fencing and sign maintenance?
PROCESS: Yes, that's covered in a long-term trust mechanism. And if it -- if it -- if it turned -- it was determined there's long-term pit lake treatment, they would do the same thing, put that in a long-term trust. And so when the mine closes in forty years, you'd have that pool of money sitting there for them to do the pit lake treatment perpetually, if it was needed.
ARMSTRONG: Okay.
PROCESS: Yeah.
ARMSTRONG: So as the project changes, the bonding increases. That's kind of what you testified to --
PROCESS: Yeah.
ARMSTRONG: -- as well as the possibility of a long-term trust agreement with BLM. Both of these mechanisms are in place to protect the environment --
PROCESS: Yeah.
ARMSTRONG: -- correct?
PROCESS: There's a -- there's probably seven or -- probably about seven or nine long-term trusts already set up with state. Like, most of the

time, it's dealt with by -- on public land, and that's why they're set up by BLM.

ARMSTRONG: Uh-huh.

PROCESS: If it was a private land situation, it would be done differently.

ARMSTRONG: So I guess last question, will mining take place in Mount Hope with this project if you don't receive sufficient financial assurance to cover all the costs to reclaim the project?

PROCESS: We -- it's a wide scope of things we cover, so they -- they're not going to be able to proceed unless the bond's in place. And we go through -- we -- you know, the staff, our administrative staff, Jane, she will actually go to the Department -- Department of Treasury and validate that this company that's going to cover the bond for the operator, she will go sure (sic) and make sure that they have the ability financially to provide that bond for that amount and that there are valid -- and the federal government validates whether that company's actually legit and can handle the capacity of money that's needed to do the bond. So there's always -- there's all kinds of steps and measures and crosschecks that go on to make sure it's solid.

ARMSTRONG: Great. I have no further questions.

CAVANAUGHBILL: Good afternoon.

PROCESS: Hi.

CAVANAUGHBILL: So a couple of questions. Do you have any bonding for pit lake reclamation currently?
PROCESS: No.
CAVANAUGHBILL: Have you ever --
PROCESS: Oh, yeah.
CAVANAUGHBILL: -- that you're aware of?
PROCESS: Yeah. We have that -- we have it for one of the mine sites that was mentioned earlier today, Lone Tree has, I think, eight or ten years of money in a bond right now for pit lake treatment at Lone Tree.
CAVANAUGHBILL: Was that approved after the fact?
PROCESS: I don't recall what the time --
CAVANAUGHBILL: Okay.
PROCESS: -- of it is, but I know -- I know it's in there because I worked with the staff member to make sure we covered that years ago.
CAVANAUGHBILL: But there currently isn't any funding for pit lake reclamation at this point?
PROCESS: For who?
CAVANAUGHBILL: For any mine in the (indiscernible).
PROCESS: Oh, yeah. That's what -- that's what I'm saying. Lone Tree mine, you know, had a (sic) issue that was brought up earlier today, and there is money assigned for treatment for at least an eight -- I think it's eight or ten-year span in the future. So we know they're treating it with trona. We know what the -- so we do make them -- once their

treatment begins, and we do have to have a bond to do that.
CAVANAUGHBILL: And you mentioned the long-term funding mechanism that goes through the BLM.
PROCESS: Yeah.
CAVANAUGHBILL: You said that's for sites that look like they're going to have issues that are --
PROCESS: If they have long-term issues, then we have operation and maintenance, so what it takes for those facilities to be dealt with to our trust.
CAVANAUGHBILL: And is that determined through the permitting process or the EIS process or a combination of all those?
PROCESS: Not usually. You know, I -- I -- and sometimes they are. I mean, it depends on the project, really. The Phoenix Project was -- you know, came up that way, and so we -- we had to make adjustments and stuff according to what was going to happen with that pit lake.
CAVANAUGHBILL: So are you aware that the Mount Hope project was classified for the long-term funding mechanism?
PROCESS: I think they had one established for a while, yeah.
CAVANAUGHBILL: Yeah. If you could take a look at Exhibit --
PROCESS: So I think they did that initially, yeah -- to get that --
CAVANAUGHBILL: Exhibit 27.
PROCESS: -- give it a -- give it a chance to grow, yeah.

But I don't know specifically what they were trying to accomplish. I have a BLM liaison that works half for me and half for BLM, and that person's the one that looks through those numbers.

CAVANAUGHBILL: Okay. Yeah, Exhibit 27 is a letter from the BLM, it looks like first to a trust company, U.S. Bank, and then to the VP for General Moly -- or Eureka Moly. But is it -- were you aware that General Moly actually asked for a refund of their trust monies in March of this year?

PROCESS: Yeah, yeah. I'm notified. It comes through my office. Anything that BLM would do like that would come through the -- either through the liaison or through the field district office. They would send me a letter that would notify the -- same with a bond release. You know, any time there's some kind of financial distributor change, I would be notified.

CAVANAUGHBILL: Okay. But it says here it's for mining solution management activities for 500 years following mine reclamation, closure.

PROCESS: Okay.

CAVANAUGHBILL: So it's anticipated that there's going to be hundreds of years --

PROCESS: Okay.

CAVANAUGHBILL: -- of ongoing activities. Do you know why that wouldn't be reflected in the water pollution control permit if there's an issue of perpetuity?

PROCESS: I think it's just always been handled by BLM because it's on -- it says land status.

CAVANAUGHBILL: So it's separate agencies?

PROCESS: Separate -- it's a land status issue.

CAVANAUGHBILL: Okay. And it looks like, though, they're not allowed to start construction until they have that trust fund pre-established, correct?

PROCESS: That -- that's really up to BLM -- I would expect they would ask them to put that long-term trust fund back -- mechanism monies back in there before they can receive it, yes. Typically --

BILL: Okay.

PROCESS: -- when -- that's exactly what BLM would do. We see -- okay, if you can't predict through an environment impact statement that there's going to be a long-term impact, then they can set that trust fund right up as the EIS is being approved and the bonding's being set up, they would set up a long-term trust fund separately, a mechanism separate than the bonding that I'm going to do.

CAVANAUGHBILL: Okay. Thank you, I have nothing else based on that.

PROCESS: Okay.

ARMSTRONG: And if can just do one redirect. And you kind of said this. I just want to bring it home, though, that although they requested to dissolve this because there was no mining operations.

PROCESS: Right.
ARMSTRONG: In the future, if there does become an issue --
PROCESS: Yeah.
ARMSTRONG: -- there will be --
PROCESS: They would have to re-establish that.
ARMSTRONG: -- entered into one with BLM.
PROCESS: Yeah.
ARMSTRONG: Yes, correct. Thank you.
GANS: Kathryn?
LANDRETH: So I'm a little confused. Would -- would that be slowly (sic) in the purview of BLM for the long-term bonding, or would you share that?
PROCESS: We share that. We -- you know, we -- we have a -- a memorandum, a (sic) understanding that we have written that -- that gives the agencies a working platform to cooperate on these types of issues. And it's on our website. It's a -- it's a memo that works with foresters and BLM to cooperate on these issues.
LANDRETH: Okay.
PROCESS: (Indiscernible), yeah.
PORTA: Just one quick question. You mentioned cease and desist of mining operations. Has the Bureau/Division issued cease and desist orders in the past to stop mining activities --
PROCESS: I've -- I've done it verbally.
PORTA: -- for various --
PROCESS: Just -- you know, I've -- a driller -- you know,

a driller's letting a solution from his drill rig run down the hillside instead of containing it with salt.

PORTA: Uh-huh.

PROCESS: Then I go out in the field. I was like, no, you can't do that. Stop right now.

PORTA: Uh-huh.

PROCESS: I've had another operator blading a road in and it wasn't permitted in the permit. He was blading -- blading the road in. I was like, that's not in your permit. So -- so some of the stuff, I actually catch on inspections.

PORTA: Uh-huh.

PROCESS: And then it's done, it's like, you got to cease and desist right now or you're in noncompliance. There's going to be fines and penalties and all that, so you better just stop right now.

PORTA: Uh-huh.

PROCESS: And so that does happen occasionally. Not very often. It's every couple years or so.

PORTA: Okay. But there's been no formal cease and desist issued to a mining company?

PROCESS: Usually, they stop right away because they don't want to get in trouble.

PORTA: Okay.

PROCESS: And so they just stop, and then we work it out.

PORTA: Okay.

GANS: Who determines what is acceptable remediation for

these bonds, therefore the amount of the bond?
PROCESS: You mean the bond release?
GANS: Yeah.
PROCESS: Well, our experience is just seeing how we're going to do it. You know, with Mount Hope, you're going to see the waste rock dumps regraded to a final topography. That's going to -- and to have a cover placement put on it with vegetation on the -- even if it's (indiscernible), you got to still got to have a cover put on with vegetation, diversion controls. All that stuff has to be all in place before we're going to release the money. So that waste rock dump facility is huge. It might be -- you know, a 20 or $25 million bond on that waste rock dump. And so they're not getting that money back until it's completely reclaimed. I prefer not to do parts of parts. You know, and it's, like, finish the whole thing, get it all done, and get your money back. That holds the -- that holds the carrot that -- to complete the reclamation.
GANS: Uh-huh. And does your department determine that? I mean, what -- does your --
PROCESS: Not -- not individually because we will call up BLM. If the -- if the -- if the operators -- there's -- in the permit, there's an attachment A and attachment B assigned to the permit. Attachment A is saying here's how you're going to

do your earth works document; import it. Here's how your -- you know, vegetation. This is what you're supposed to do. And they will file those port -- reports of attachment A and attachment B with our -- with our office and BLM if it's both of us involved, even if it's just -- you know, I'm involved, still involved because I write the reclamation -- or my staff.

So we'll -- we -- we coordinate a field inspection to see if they've met the conditions of what they wrote on this report, and if it's met -- field, actually. And then, if we see, hey, this looks good. Vegetation's waist high. The cover's performing. We don't see anything coming out of anywhere. It all looks good. Then we -- then we agree to release the bond, and we coordinate that with the bond release letters --

GANS: Uh-huh.

PROCESS: -- formally. And that lets the surety company or whoever is bonding them, lets them off that reclamation liability.

GANS: So I've -- I've heard that this is a 44-year project. That means that there probably won't be much done for 44 years, and there's an inflation factor here. If we're looking at 120 to 150 now, we could be looking at three-quarters of a billion or a half a billion dollars forty-four years from now. Is that --

PROCESS: Just the last two years, the SRCE model has gone up over 11 percent. You know, and that's costing a lot of money. Eleven percent's a big increase. But most of it's fuel cost right now.

GANS: Uh-huh.

PROCESS: It's not labor. There's a little bit of labor cost in there too, of course. But we do it every year. So even 45 years from now, it's still going to be -- still going to be continuing to increase every year for inflation to account for the cost of doing business.

GANS: So that contractor has to -- or you know, the permittee has to make sure that they are there with that bond as it increases year after year after year.

PROCESS: Yeah.

GANS: They've got to accept that.

PROCESS: Our requirement is every three years. In this case, in 519A regulation, every three years, you have to update for inflation. But this -- this project's phase-bonded. So that means that the BLM has their regulation and authority. They could say you have to bond it every year, update it. But I don't have to do that. I can oversee that they do it, but I don't get into the nuts and bolts of it every single time because our regulation only says three years. If I do phase bond it with BLM in this case, then they -- BLM will say you have to update the bond every year.

GANS: This is a -- a gigantic project, in my opinion, and I --

PROCESS: It's -- it's 8,000 acres. We have stuff that's 12,000 acres, 15,000 acres --

GANS: That was going to be my question.

PROCESS: -- 20,000 acres. It's kind of middle range.

GANS: Okay.

PROCESS: Yeah, compared to the other sites we work.

GANS: Right.

PROCESS: Yeah.

GANS: Anything else from the panel? Okay, we appreciate you.

PROCESS: Thanks.

GANS: Thank you very much.

Do we want to go right into rebuttals, or do you want a quick break, or --

BILL: So I'm -- we could do right into rebuttals. Do you need a break?

PORTA: I don't know if you wanted to -- five minutes?

ARMSTRONG: I think if we could take ten.

PORTA: Yeah.

GANS: Ten-minute break it is.

PORTA: Sounds good. Sounds good.

GANS: Be back here at quarter after.

PORTA: Might need a couple hours on this one.

GANS: Quarter after 4.

CAVANAUGHBILL: Think we might finish today.

GANS: Julie, I just thought you were part of the audience.

CAVANAUGHBILL: I just blend in.

(Recess taken)

GANS: Katie (sic), can I proceed with rebuttals now?

ARMSTRONG: Yes, absolutely.

GANS: Okay, and that's where we are. We're to the rebuttal section of this. And so I'm assuming there are rebuttals. I'm not going to make any assumptions here, but Julie, you would go first.

CAVANAUGHBILL: Thank you. We'll call Dr. Glenn Miller.

MILLER: Can I stand and get that picture, that cartoon back, that pit lake? Is that possible?

GANS: Which one?

CAVANAUGHBILL: I think it's 310.

MILLER: There was a cartoon that everyone referred to.

CAVANAUGHBILL: I think it's 310. That one.

MILLER: This one.

GANS: Got it.

MILLER: Can I stand? Is that permissible, or would you --

GANS: No, I'm good. You're just going to have to make sure your voice projects.

MILLER: Yes, yes. I'm an old, old instructor.

CAVANAUGHBILL: Okay. Dr. Miller, you heard Dr. Johnson's testimony -- or Mr. Johnson's testimony, right?

MILLER: Right.

CAVANAUGHBILL: Okay. And do you have -- what is your response to -- he talked about the Rhine model and then, about concentration levels in particular, 150 milligrams in the pit lakes, and --

MILLER: The -- the -- the issue is -- first of all, there's probably three -- three pit lakes that -- that I'm aware of that have filled where there's been pit lake models. One is Sleeper, Lone Tree, and then a pit in California, the Carbon (phonetic) pit. All of those models -- two of those models showed local sulfur concentration. They were at gypsum saturation. And the reason -- and I've -- so I've not seen a pit lake that has had 150 milligrams per liter, and -- and -- and -- and the -- the issue, the modeling -- I'll just very quickly go over it.

If you look at a groundwater table as up here pre-mining, up here, and then you drop the water table down all the way to the bottom of the pit -- and this is -- remember, the pit -- the -- it was very -- it was very steep. It has a steep and deep pit. When you drop the water table, you have the -- the previous groundwater, and then the groundwater is down -- when you stop mining, it's down here. And when you -- when you take the water out of that pit -- or excuse me. If you take the water out of that groundwater system, it isn’t a vacuum. It fills with air, and so you have what's called -- it's advective flow, transport of oxygen and air far into those reaches. And you can pretty much assume that most, if not all of that oxygen, is going to be consumed by oxidation of sulfites.

And so you have oxidation that's going to occur way beyond pit. This, I'm almost certain, is what happened at Lone Tree, and they way, way underestimated the amount of sulfuric acid that was going into the pit. And so you -- this Rhine model is -- is here. I don't disagree with everything Mr. Johnson said about the oxidation rates here. That's -- that can be a very, very small part of the total oxidation that occurs way back here as oxygen is sucked way back into the -- into -- into the -- into the -- well, it used to be water, and now it's air because you dropped the water table; it's not a vacuum. It sucks air in -- in entire amount.

And so when that pit lake fills back in, it -- it fills in, and as it was discussed, there's no argument there with the fact that it's a terminal lake. It fills in and rinses everything in the pit lake.

So it's not just this amount that gets rinsed in right on the edge. It is the amount of oxidation that accrued, and that's going to be very hard to predict because you have to know how much water was removed, how much water comes in to fill that area from -- from other areas, so it's very difficult to predict. But that's why I don't think -- I -- I think the pit lake model -- and I think Mr. Johnson and I'll both be dead when it starts to fill, I think, and so this is almost an academic argument.

But that's why I would argue that that Rhine model is -- is -- is definitely part of the -- of a pit lake model, but it is not all of it, and it's one of the reasons why I think that -- that the -- the -- going back to the original argument, is fine. If you believe that, and that's what you're -- that's what you're studying, go ahead and assume that's going to be it and bond for that level of water quality. If that's okay, well, I'll go with that. I'll go with that. I would go with that. See, if that's what you think the water quality is -- is going to be, let's bond to keep the water quality in that -- in that state.

I don't know if any mining company's going to take that deal, but -- but that's kind of what we look at as far as making decisions, and that's why this beneficial use argument is a good way of mitigating whatever risk that might --

CAVANAUGHBILL: Thank you. Thank you, Dr. Miller.

MILLER: Excuse me. Sorry.

CAVANAUGHBILL: Oh, did -- Mr. Nubel might have questions for you.

NUBEL: No, I don't have a cross-exam.

CAVANAUGHBILL: Okay. Well, then call -- these two are Kempton, Jason (phonetic)?

NUBEL: Just the one slide.

CAVANAUGHBILL: No.

NUBEL: Oh, you don't need that. Okay.

CAVANAUGHBILL: But I could use the one for 5 -- 529.

NUBEL: (Indiscernible).

CAVANAUGHBILL: Okay, Mr. Kempton. You've previously been sworn. I forgot to remind Dr. Miller of that, but you're still under oath. You recognize that, right?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. So you heard the testimony of Mr. Johnson as well?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. And with respect to the waste rock pad, which we're going to put up here, it's --

NUBEL: Is that the one?

CAVANAUGHBILL: No, it's this one down here, down on the lower left corner and in the commissioner's notebook too, Exhibit 13. Okay.

So do you still -- because in your prior testimony, you had concluded that with the light, permeable material, that there would be leakage.

KEMPTON: Yes.

CAVANAUGHBILL: Acid rock leakage through there. And when Mr. -- I believe it was Schulenberger (sic), Matt?

NUBEL: Schulenberg.
CAVANAUGHBILL: Schulenberger (sic)? He testified that they had designed this so that there was a slope so that any leakage would drain into the pipe there --
KEMPTON: Yes.
CAVANAUGHBILL: -- at the bottom. Do you agree with that construction? Do you think that's going to do the trick?
KEMPTON: So what that diagram, which I had not seen before today -- what that diagram on the left shows is a section underneath the drainpipe of a 60-milliliter HDPE high-density polyethylene liner. So part of the area, which I believe is underneath the potentially acid-generating waste rock facility, would have that essentially impermeable liner under it that would go to the drain. So my opinion, then, is that water percolating down through the waste rock that happened to flow into that drain area would, in fact, be captured by that pipe because that is a truly impermeable zone.
But in that figure, that layer of HDPE ends just to the right and to the left of the drain pipe. So I would assume that water that is to the right or the left of the HDPE layer would just move on down to the water table.
CAVANAUGHBILL: So you'd still have the leakage issue?
KEMPTON: I think it would still --

CAVANAUGHBILL: On this --
KEMPTON: Yes.
CAVANAUGHBILL: And you're talking about those dark lines, slashes? So beyond those --
KEMPTON: Yes. Down below the -- the -- image on the --
GANS: Is there a pointer? Is there a pointer that he could have?
CAVANAUGHBILL: There was a red one. Okay. Thanks.
KEMPTON: Yeah, so that little dashed line is where it says HDPE. But I would presume that water moving down outside of that zone with the HDPE liner would just move on down into the bedrock and into the water table.
Now, one thing that would be helpful would be to see an unsaturated flow model showing the flow lines of water through these material types. I don't see anything in there that would cause percolating water, then, to be diverted -- diverted into this capture pipe, but if there's something like that in the design --
CAVANAUGHBILL: And can you describe the difference there with the saturated versus unsaturated and how that would work?
KEMPTON: Well, under operation, this all ought to be unsaturated, except for the water that would pool up right around this drainpipe and then percolate out. So that would be water that would be captured from the edges of the high-density

polyethylene liner right and left there.

But I don't see anything that would make me think water percolating outside of that impermeable layer would divert to that drainpipe.

CAVANAUGHBILL: Okay, so what would be the solution so we wouldn't get the --

KEMPTON: Well, one thing would be to extend the liner, the impermeable liner, HDPE liner, under the entire potentially acid-generating waste rock facility. Another would be to cap the facility with a layer that stopped oxygen from moving through. There's different thoughts on how to manage --

CAVANAUGHBILL: Okay.

KEMPTON: -- acid-generating rock under field conditions, but --

CAVANAUGHBILL: Okay. And you heard Mr. Johnson's testimony regarding the pit lake water quality?

KEMPTON: Yes.

CAVANAUGHBILL: Okay. He was asked about the error that you had pointed out, and he described his involvement, I guess, and his opinion. Do you believe that there's still an error after hearing Mr. Johnson's testimony?

KEMPTON: I do, yes. I would thank everybody in the room for listening to this kind of back-and-forth conversation and its pretty detailed discussions about how pollution comes out of mine rock. And it's usually handled at a smaller scale with a smaller number of -- of technical people having conversations.

So I guess I'd give an -- an example or two. One flaw, I -- I would still contend, is in -- well, let me back up. Let me say, first of all, the difference between these little laboratory tests and then the field conditions, as -- as -- as Mr. Johnson pointed out, in a laboratory test, they're broken. They're quarter-inch and less size versus the field. So the scaling effect that they included in this Schlumberger 2010 prediction took that into account by looking at the surface area. These reactions are between water and air and -- and a solid interface, the solid minerals. And so they took into account the scale between the surface area estimated under field conditions versus what would be estimated in a laboratory test. And that's how they came to this number, .3, is my understanding.

I didn't have any criticism about how that was done. I would maybe postulate that the -- we -- we would put a pretty big range on that scaling factor. Mr. Johnson had suggested it might be -- load from wall rock might be a thousand times less. I that's -- would be maybe too big of a range, but -- but those kind of scaling effects have a pretty big range.

So that effect, I think, has already been accounted for in the simulation in the Schlumberger scaling from the laboratory to the field in terms of surface area. I -- a decision in the model was to use directly the concentration that comes out of the laboratory test. And I would just reiterate, that is a really arbitrary test. It is weak because it fits into the schedule of people who work seven to five days a week. It is a size that's easy to pick up. The amount of water is also matched to the amount of rocks, so one kilogram of water to one kilogram of rock. So it's really arbitrary.

Under the field conditions -- I would just ask us to bear with me for this little example. So thinking about a mine bench -- and five feet was what they talked about approximately, this damaged rocks that are about five deep. So standing on a -- on a mine bench and five feet of rock. In a year, almost 15 inches of water falls on that, but then two-thirds of that evaporate. So it's about five inches a year that falls under -- into it and percolates and/or runs over the surface of the -- of the wall rock. Five inches a year in a five-foot layer of rock.

In the laboratory test, it's equivalent to adding about two feet of water over this five feet, but not over a year; every week. It's equivalent to adding two feet of water to this five foot of rock every week. So in the course of a year, it would be like 100 feet of water. So an enormous amount of water, not five inches of water, like 100 times the water in the laboratory test. So that has produced an enormous dilution effect.

So 100 feet versus 5 inches, something over a factor of 200. So we keep kicking around these factors of 100, 1,000, and these errors, but I would just point out that the laboratory test has an enormous amount of water, huge water-to-rock ratio relative to what is under the field conditions. And so that is a big part of the effect that concerns me.

If somebody could point me to where the pit lake model report is, the 2010 --

CAVANAUGHBILL: Exhibit 9.
KEMPTON: Exhibit --
CAVANAUGHBILL: 9. And you're looking for the scaling?
KEMPTON: I'm looking for Appendix E in that report.
CAVANAUGHBILL: Oh.
KEMPTON: Is that --
CAVANAUGHBILL: Appendix E is Exhibit 11.
KEMPTON: Exhibit 11.
CAVANAUGHBILL: Midway in the exhibit.
KEMPTON: All right. And then --
CAVANAUGHBILL: It's NDEP 423.

GANS: Do you have a page?
CAVANAUGHBILL: NDEP 423.
KEMPTON: Yeah.
PORTA: Exhibit 11.
GANS: Oh, 11.
PORTA: Yeah. 423.
KEMPTON: All right, and the -- I apologize for --
CAVANAUGHBILL: Look down the lower right-hand side, NDEP 423.
KEMPTON: I've got the Appendix E. I've got that okay --
CAVANAUGHBILL: Right.
KEMPTON: -- but there's a part of the text where it describes how the model is done relative to time. It talks about the rate. It's the point where it references Appendix E. It points to this.
CAVANAUGHBILL: Oh. Sorry, that would be NDEP 308.
PORTA: Sorry. I've -- I've lost sight of the question that you posed to him.
CAVANAUGHBILL: I was asking him his opinion to explain why he still believes an error, even in light of Mr. Johnson's testimony.
PORTA: Thank you.
CAVANAUGHBILL: Mr. Johnson said he didn't know where it was, that it 353 he thinks there was an error.
KEMPTON: So I'm going back to -- so page 21, Exhibit 9. One, two, three, fourth full paragraph.
So I'm always looking at the rate. To me, whenever I get these modeling studies, I think, how fast is it producing pollution in the wall

rock? And so I find a sentence -- sentence. It says, "Rates of solute release were calculated using scaled humidity cell test data to represent both the pit wall runoff and submergence terms." That seems very logical to me. "The approach used to scale the data is described below, and example calculations are given in detail on the worksheet provided in Appendix C."

So okay. Now, we're going to be at the rate of how fast pollution comes out of -- out of the wall rock. Appendix E is a few panels that show some example -- examples --

CAVANAUGHBILL: And that's NDEP 0 -- or 423.

KEMPTON: Exhibit 11, NDEP 423. And so here, in the appendix, which describes how the calculations are done based on the rate, it talks about how they've scaled the surface area from laboratory to field conditions. But the word "rate" is not in here, and there are no units that have -- that are in terms of rate in, like, kilograms per time or milligrams per year. And there -- in fact, I don't see any -- any unit in here that even has time in it. So that makes me worried when I see that they have talked about rate, and then when you look at the example calculation, there's nothing in there about rate. And so my understanding from reading that is implicit in that, by omitting any discussion in using these average concentrations from these laboratory tests, they are implicitly assuming that the load coming out of the rock is over a week. So they don't mention that anywhere else; it doesn't appear in the model. It doesn't seem correct to me.

It seems to me when you have long duration -- months, years, decades, centuries of exposure time -- and you're not thinking about the rate, and that's a problem. It's an -- it's just a conceptual omission. And when you're calculating the concentration by using a laboratory test that is diluted by something like 200 times relative to the conditions under the field, it doesn't seem to me that -- it doesn't make sense to me. It seems like it's, again, a systematic error, a large error. And again, I'm grateful to everybody who sits and rides through this.

And I would say I believe that Mr. Johnson and I, with maybe one or two other people, could sit over time and come out with equations on a board. I'm always looking for things that you write -- time versus times the rate, times the area, and you get some number; here's the load that comes out into the lake. And there's nothing like that that I see in this report. It doesn't distill into a simple explanation of how these amounts of pollution are calculated.

CAVANAUGHBILL: Thank you. I'm done. That's all I had.

KEMPTON: You don't have any further questions from (indiscernible)? Thank you.

CAVANAUGHBILL: Thank you.

GANS: And you're done?

CAVANAUGHBILL: Yes.

NUBEL: Good. Okay. I would like to bring Mr. Johnson forward to defend his model.

GANS: This is the suspect guy?

JOHNSON: Inherent bias?

NUBEL: We'll keep this short. So, Mr. Johnson, did you hear Mr. Kempton's reiterated concerns about your model?

JOHNSON: Yes.

NUBEL: And could you please address those concerns?

JOHNSON: Yes. There are a lot of -- there are several ways to get chemical mass from laboratory experiments into a model that simulate that mass making it to the pit. The way that Houston was discussing this was he was looking for a rate. The rates are a calculated model. They are not explicitly listed in the report because they vary significantly through time and space.

So those are all accounted for in the model itself, because we have a volume of water; like I described, there's a certain amount water that falls in the pit walls. We can calculate that explicitly to a hundred gallons, or whatever the number is. And we have a chemistry that is a value to that water, which might include a hundred milligrams per liter. We have a hundred liters, we do the math, and we can come up with an amount of mass of sulfate, or whatever, that ends up in the lake.

So I've seen colleagues who use the rate method; there are a lot of them. I don't use that method to get the mass into the lake. The end result is identical, whether or not you calculate a rate and you list it out in a table, or you calculate it in the model from concentration volume.

Now, the calculations that are presented in what he just described were scaling calculations. So how much sulfate comes out of a particular volume or mass of rock with a certain specific area associated with it? And it gets complicated, but you basically account for the difference in grain size, and you account for the for the amount of rock that's involved in the reaction. And that can be done several different ways. And the way that we do it is have a concentration, and we have a volume of water, and we multiply those together every time step. That's accounted for.

NUBEL: Okay. Thank you. That's all the questions I had.

CAVANAUGHBILL: I have no further questions. Thank you.

NUBEL: Okay. I think we're -- we don't have any more rebuttal witnesses, do we?

GANS: We're done with rebuts?

CAVANAUGHBILL: Right.

GANS: Okay. So the panel now has its opportunity, if it so desires, members to ask any questions of any of the witnesses or the two people sitting in front of us. Kathryn, do you have anything?

LANDRETH: I don't think so, not at this point.

CAVANAUGHBILL: No.

GANS: I do. First of all, I want to make sure, Dan, that I understood you earlier. When we had the last meeting where we ruled in favor of the Appellant, you had put something on the table that was a little different than what -- where we are today; is that correct?

NUBEL: Yes.

GANS: Will you explain that, please? What it was, where you went, and where you are today.

NUBEL: Yes. So we recognize that this appeal process is comprehensive, and there's a lot of work and time that goes into it. So we offer to the panel and to Great Basin Resource Watch the offer that we would change the permit to include a term that required additional characterization and modeling to be done that -- before Eureka Moly got below the water table. And at that point there would be a new appeal that they could initiate.

So the way that the permit currently exists, there will be that additional characterization, there will be that pit lake study; but the appeal process will begin again once there's either a major modification to the permit, or an amount of time has elapsed under the regulations. So it would not give Great Basin Resource Watch that appeal process once the NDEP receives those additional studies if those studies show that there are no major modifications needed.

GANS: Okay. So I think it's time that we go on.

PORTA: Yeah. But they still have the appeal right during any permit renewal.

NUBEL: Yes, yeah. Once the appeal the permit renewal process comes up, they'll get that appeal, or if there's a major modification --

PORTA: Right.

NUBEL: -- and the renewal comes up --

PORTA: Okay.

NUBEL: -- then they'll get that process again. For new information received. Obviously, we wouldn't want to re-litigate the issues that are current and are discussed about.

PORTA: I did have one question. Todd is in charge of the reclamation branch, and I asked him about cease and desist with regard -- and he was

getting back to me with regards to reclamation work. The Mining Bureau, in and of itself, that issues the permits for operation, have they issued cease and desist orders to various mines for failures of permit and violations of permits?
NUBEL: Yeah. I'd have to bring up a witness to attest to that if you'd like.
PORTA: Yeah, why not? Because that's kind of one of the questions here that, you know, the toothpaste is out of the tube analogy; once mining starts, it's all over. So --
NUBEL: Right. And, you know, I would respond to that point. I think that the horse is out of the barn argument is a little different in this context --
PORTA: Um-hum.
NUBEL: -- than it was in the (indiscernible) context.
PORTA: Right.
NUBEL: So in this context, there's going to be additional studies completed, additional reports done; and at that point, you can increase the bonding. You cannot issue another permit if you see that the new information shows that it's not going to comply with regulations.
PORTA: Right.
NUBEL: So I don't -- you know, the horse out of the barn argument, I think is a little unfair to NDEP that in that it assumes that NDEP would move forward on permitting a project that goes against

regulations. And if that did happen, then they would absolutely have the right to appeal again --

PORTA: Um-hum.

NUBEL: -- and bring those issues to light. But I could bring someone up here to answer that.

PORTA: No, I think that's fine.

NUBEL: That's good enough?

PORTA: Okay.

GANS: Okay. Are we ready to proceed with closing arguments? Okay. I want first (indiscernible)

CAVANAUGHBILL: Okay. Thank you for your time and patience today, too, the whole room. So -- well, today has been enlightening, a lot of information. We appreciate all the witnesses and the civility, but I'll try to be brief here.

We stand on our appeal. I think what today has demonstrated is that we've got one expert who is saying that there was a plot in the pit lake water quality analysis. And if that was the case -- and that is what the basis for this (indiscernible) that was discussed by one of the State's witnesses; that is based on the pit lake water quality analysis. And so if there is a flaw there, now we're flawed over here and we're in violation of NAC 445A.429 because we really don't know what the effects on the environment, human, or avian life is -- because that underlying analysis is flawed if Mr. Kempton is correct in his analysis. So there's a huge issue right there.

And then we've got the acid leak drainage. I think it was -- I think Mr. Kempton was very convincing in terms of, you know, we've got to have that higher level permeation liner in there. It's only covering parts of it -- a parcel of it. We're going to have leakage coming out there. And as Mr. Kempton explained, he believes that's going to go down into the soil and into the ground water. And how do we fix that afterwards? Now is the time to fix that; we have time to fix that.

And we have time to go back. And as Mr. Kempton offered -- you know, Mr. Kempton, Mr. Johnson, maybe someone from the agency and someone from the company sit down and try to figure out, you know, did we do the testing right in terms of the pit lake water quality report? You know, when were the samples taken?

Because listening to Mr. Kempton and Mr. Johnson, it really isn't clear the way the report describes it, so I think even looking at some of those underlying -- the testing documents, they may get more information. So that needs to be done. And there's no rush right now. I mean, the company is sitting there waiting themselves.

They just took back their long-term trust fund money, so it isn't like they're waiting there to break ground.

So now is the time to do it. The public deserves that, to have this done right. A lot of community members who are very concerned about this -- I think that was one of the reasons the long term, the 500-year trust fund was implemented by BLM was because of a lot of concern from community members. And so -- but we've also got, you know, this pit lake model that Dr. Miller talked about, and the concerns about that.

I think it's a very legitimate request that there be that beneficial use designated. We believe that the Commission has authority under the NACs to designate or to direct the Commission to designate that beneficial use, and to have some kind of water quality standards set up for it. As Dr. Miller testified, these pit lakes are becoming bigger and bigger and more and more problematic, and as the State Commission that's in charge of protecting our State waters, this is the right place to go to try to get that moving with the agency and to give the agency some direction on that. Thank you.

NUBEL: Okay. Good. So I want to thank you all, as well. I know that some of this information is very detailed and technical, and we appreciate all of you taking part in this and asking questions, and I think it's been a very thorough and a good process for the public.

So I would like to point you again to the standard that you need to consider in making your determination. And that standard was actually articulated well in Great Basin Resource Watch's that said, "The decision of an administrative agency will generally not be reversed unless it is arbitrary or capricious." The brief then stated that, "A decision is arbitrary or capricious if it is baseless or despotic or a sudden turn of mind without motive."

That's not what happened here. That's not what Great Basin Resource Watch showed here. NDEP put on Matt Schulenberg, who discussed the waste rock facilities and the protections that would be in place, and he addressed Mr. Kempton's concerns regarding those facilities. He also discussed the SLERA, which showed that there would not be any risk to human or animals from this pit lake. We also put on testimony from Christine Olson, who showed that this is going to be a terminal sink. And although it was stated in their comment letter and their briefs, they didn't contest that issue today, that this was going to be a terminal sink.

And since it is a terminal sink, that means it does not have the potential to degrade the groundwater surrounding the pit lake. So when the water comes in and becomes affected by the metals and whatnot within the pit lake, that water does not go back out into the groundwater. It only evaporates. So if you look at the regulation that we're applying here, which is NEC 4458.429, there is no possibility of degrading the groundwater by this pit lake. And they haven't even contested that today.

Next we provided the testimony of Brent Johnson, and he went through, in a detailed and meticulous way, the validity of the scientific methods that were utilized in his study and directly addressed the concerns brought up by Great Basin Resource Watch (indiscernible). I think that that discussion went into highly technical and detailed fields, and I would say that, you know, given Mr. Johnson's education level and also those presented by Great Basin Resource Watch, there does seem to be some kind of dispute about whether there's an error in that.

However, if you look at the standards here, you need to decide not just is there -- the Great Basin Resource Watch hopefuls into the studies that have been put up to NDEP. The standard is, did NDEP act in clear error? Did NDEP ignore reliable, probative and substantial evidence on the whole record? Did NDEP issue a decision which was arbitrary or capricious?

And I would submit to you in testimony from Brent Johnson, you will see that NDEP's decision was not arbitrary or capricious. It did consider a substantial amount of data. It did consider a substantial amount of studies, and it is supported by scientific methods. I do think that some of the arguments brought up by Mr. Kempton -- and one of those being his calculation that he put in the comment letters -- when I asked him about that, he stated that he got those from various mines around the state. Didn't necessarily state which mines they were, versus NDEP's decision, which is based on actual data that was collected at this site and is testable and verifiable and which is what Mr. Johnson spoke of.

And lastly, we bought up Todd Process, who discussed the bonding process that's in place to insure that if something did go wrong with this process, which is totally not expected based on the data we have, then there would be money to address those concerns.

There's been a lot of dialogue regarding the independent review process. And to be clear, if this panel required NDEP to undergo an independent review process; that would be totally precedent setting. There is no statute or regulation that requires an independent review process. I would submit to you that NDEP is the independent review. They're the ones who receive the studies, and they evaluate it based on the scientific methods utilized, and then go to their own experts like Christine Olsen or like Matthew Schulenberg, who then decide whether the methods utilized were acceptable.

NDEP is not in the pockets of the mines. They're also not in the pockets of Great Basin Resource Watch. They are the independent review here. And really, any suggestion by Great Basin Resource Watch that an independent review should take place here; that's a suggestion for the legislature for a regulation change. Because NDEP did not act arbitrarily or capriciously in not requiring a review that they didn't even have the power to require.

The last argument I'll address is the beneficial use, which I think ties into the previous argument that this beneficial use being required for all pit lakes; that is again something that needs to be decided by the legislature. There are a lot of arguments that I could think of both ways, and I brought some of them up to Mr. Miller, which are that some of these pits are not necessarily ideal for some kind of beneficial use.

You don't want people going down a 2,000 foot steep mine pit. In fact, if you made a beneficial use for it, you'd be inviting them to do so. There's liabilities to consider; there's dangers to consider; and those are all matters that should be decided by the legislature with the proper people brought in to decide if we want every pit lake to be turned into a fishing facility or a boating facility, or what have you. But here, we're fine with the regulations and law as they exist now.

And so the question that you will need to ask yourselves is whether NDEP acted arbitrarily or capriciously in applying those. And I will submit to you based on the evidence we've presented today that it did not.

Done, except for questions that you guys have for me.

PORTA: I don't have any questions.

GANS: I don't think we have any questions of the Appellant or the State. So that now brings us to our next portion of this process, which is the deliberations and voting by the panel. We will -- you can listen to us rave on a little, where we're going and what we think. So, Kathryn, did you want to start with anything?

LANDRETH: I'm just trying to find -- I think there are other standards of review besides the arbitrary and capricious standard; and one, I think, is the decision affected by error of law. But is -- are there three different standards? One is arbitrary and capricious; one is error affected by law -- I thought it was something like that -- and then there's a third.

CAVANAUGHBILL: And it's clearly a (indiscernible) in view of reliable and probative and substantial evidence on the whole record, and then that the position this one is arbitrary or capricious or characterized by abuse of discretion.

LANDRETH: Okay.

NUBEL: Well, I know we're in deliberations, but --

GANS: No, I'm fine.

CAVANAUGHBILL: Yep.

GANS: She's asked the question --

CAVANAUGHBILL: Yeah, she asked it.

NUBEL: Yes, and I will just say that we articulated that standard in our opening, which I will state again, which was provided by the Supreme Court. So in order for Great Basin Resource Watch to show that there was an error of law, they must demonstrate that NDEP's decision did not comply with substantial evidence. And then the Supreme Court stated that substantial evidence exists if a reasonable person could find that evidence adequate to support the agency's conclusion.

LANDRETH: That's where it sort of turns for me, frankly, is whether there was substantial evidence to support -- first of all, before I even get into that, can I just say something?

This was a marvelous example of professionalism on the part of the attorneys and the witnesses. It was an honor to listen to you and hear you. I am so impressed, and what I'm -- so having said that, I'm really struggling with this, because I found Mr. Johnson's testimony very, very substantial about his model and the use of it.

I remain deeply concerned about the issues that were raised by Dr. Miller and Mr. Kempton. And I'm not sure that they were refuted, particularly the issues related to the potential for leakage with the -- both the liner and with the problems in the groundwater with the oxygen coming in and oxygenating the sulfides; so the opportunity for groundwater.

Those things, those issues, remain unresolved for me, and they are of deep concern because we're going to be gone when the impacts of this could be felt. I'm going to be gone, let me put it that way, when the impacts will be felt. And I am concerned about that. I'm not going to resolve anything right away. I am drawn to Dr. Miller's suggestion -- and probably it should be by regulation, but we don't have that, and I suspect we would have the authority to consider directing the mining operator to commit to a beneficial use and then work towards that. I just find that as a long-term, wider issue than Mount Hope, a good idea.

In Nevada, for too long we've probably ignored some of the consequences of these things, so I am drawn to that. I'm very much concerned about what Mr. Kempton said about having a record that appears to have some significant errors in it, the calculation error. I'm not sure that was ever addressed, and I'm not clear where we were, that the .37 inches times -- that would result in the 124 inches of rain, as I recall, or something like that. I'm not sure those issues were resolved adequately, so I am concerned if we have a record and we're basing a permit on documents that seem to have noticeable errors that are the foundation for the decision.

And finally, I would say the idea of bringing in a third party has tremendous appeal to me. And it's not a question of ordering NDEP to do it; it's sort of a question of whether we can all come together with one concept and talk about having a third party come in that could help work through some of these issues that, in my opinion, have not been resolved.

I don't think Dr. Nickerson (phonetic) as an employee or contractor of the mining operator constitutes the kind of discussion that I would anticipate having, where there would be a real forum for some of these issues to be resolved.

So bottom line is, I cannot, at this point, wholeheartedly endorse the permit as it stands today without what I would hope would be some recognition that there are serious issues that have been raised by qualified experts; and in the case of Dr. Miller, a really recognized authority in this field about the problems with the Rhine model and how -- and the fact that it should be address -- those problems should be addressed in some way.

When there is no good example that he can bring up of a pit lake and modeling that really resulted in an accurate determination of sulfate levels, that causes me alarm for us just to say there would be no problems with the water quality. So I'll stop there and let the two of you respond.

PORTA: Yeah, I -- you know, there's many pit lakes in Nevada that the Division has dealt with over the years. And when you're trying to look into that crystal ball and predict a hundred years, two hundred -- you know, even three years after reclamation, I think it's very difficult. And for us to try -- you know, this panel to try to second guess is one model better than another, or is the model not refined enough? You don't have to defer the technical expertise to the Division and the comment that was made that, essentially, they are the referee on these difficult, technical decisions.

I certainly don't possess the expertise to try to wade through this and determine which model is better and the inputs, and so forth. I've certainly heard testimony from both sides. One thing I did hear that I think was clear from both sides is that there's always uncertainty, no matter what we do here; no matter if there's a third-party review, we keep it as is; and even with all that, there's going to be uncertainty from that process as well. There's simply no guarantees.

I feel all we can work with is what -- the regs that have been put in place for the Division to operate under. And in my opinion, from what I've heard today, I did not see, you know, evidence that would grossly overturn what the Division has reviewed and looked at and made its determination to issue the permit.

I'm certainly concerned about pit lakes and water quality standards in this State. You know, we've had surface water bodies, Wataker (phonetic) Lake that went years without a water quality standard. Now, it's not even close to being a pit lake; and even some of those standards were shot down after the Division had passed them by the legislature. So it's a touchy subject.

I would like to see in the future some type of discussion about this. You know, is it appropriate for the State to adopt beneficial uses for a manmade pit lake; not just manmade, mining made pit lake; is that appropriate, and is there even a use for it, a safe use for it?

I think a lot of these pit lake issues revolve around safety of people, not so much plants and animals, but just, you know, people falling off a bench trying to access it, you know. And I think you're right; if you put a beneficial use on it, that creates an attraction. But that's not for us, I don't think, to decide. I think that's, as a lot of people say, above our pay grade, for somebody else to make that determination. So that's kind of where I'm at.

GANS: Well, I was impressed with -- I'm going call them Johnson and Miller. I didn't agree with them totally, but I think we had two -- two very, very good witnesses on opposite sides of this issue.

It always bothers me and I was just a (indiscernible) administrator when two attorneys try to tell me that it's my way or the highway. That always bothers me. Katie, you know where I'm going. I don't like -- I don't agree with Dr. Miller that we should set a beneficial use or we should use this particular project to go out there and assume authority that I think is the legislature's. I just don't think we should be doing that. Not us. And really, not the three of us.

If anybody has the expertise, it's Tom. It's sure as heck not me; and I know, Kathryn, you feel the same way as far as that kind of technical expertise what to do. But I don't disagree with Dr. Miller that, you know, come on, it's time. Maybe it's past time that the State should look at this. But not -- not here.

I also heard -- is it Dr. Johnson or Mr. --

PORTA: Mister.

GANS: Mister. Okay. Good. I don't believe -- I'm not really in favor about a third-party overview or a third-party coming in here and telling us what -- and I tend to agree with you, Dan, that might be precedence setting that I don't want to be a part.

However, I did like a couple of comments that were made by the witnesses about why can't we just get three or four people together -- a few people and talk about this or not, and come to some kind of conclusion. If you call that a third-party review, I don't. I've used it in my administrative practice years ago. And I heard Mr. Johnson say, hey, bring it on. It can only be better. It only helps me with what I'm doing, my work, and what we're all trying to accomplish here. So I'm really torn because I make -- by the way, I think the State did its job. I think, you know, you met (indiscernible). This is not arbitrary and capricious by any stretch of the imagination.

But I also think that the opponent brought up some points that really bothered me. These gigantic pit lakes scare me. I'll put it to you that way. And when I asked for the site, it was a mile across. This really is a lake. It's not a pond, and that bothers me when you have that size. And if the public out there isn't asking questions, you're just wondering what does this mean? They should, in my opinion.

So I am torn, like Kathryn is, with this whole issue and I knew I was going to be because I think we have some very competent experts. Not to mention, I have to say that the attorneys are even competent in bringing this stuff forward. I'm not -- Katie, I'm not knocking you.

So I -- I'm not willing to just go forward and say, hey, it's black and white, black or white. State, you're right; Appellant, you're wrong. I don't feel that way. I really don't. I think the State did their job. I think you met the law. I think you went through it and did what you should do under the law.

As it stands right now -- and I don't think we should change that law. It's not up to us to do that. However, I think the Appellant has brought up so very serious and appropriate concerns that should be addressed. And I'm not sure that I'm comfortable with addressing them after the mine is underway. I would prefer to address them now, while we have the time or the opportunity. How to do that? I don't know, because I agree with you. I don't want somebody third-party coming in and telling us, you know, both parties -- well, this is the way it should be. That doesn't work in my -- so with that, if you don't mind, I would like to throw it back to the two attorneys. I'm not willing to go black and white with this, you guys. It's my own vote. I'm only a minority.

PORTA: Chairman Gans, I think to your point about, you know, again, we're talking about uncertainty here. You know, the Division -- Great Basin made comments on the permit, and I thought the Division responded to a number of those comments in there. And kind of when you look at it, it's about compromise and about what the Division feels -- and they're our technical arm, right? We rely on them to do the technical heavy lifting for those things and convey to us how that was done. And I -- I feel that was done, and they also worked with Great Basin to increase the monitoring and some other aspects of the permit. So I think, you know, we're on the right path here. I don't think anything was done -- definitely not arbitrary or capricious. If anything, they included the Appellants in the issuance of this permit and the public.

GANS: Well, they included it in '12.

NUBEL: In '17, as well. That's what the comment that we attached as an exhibit was for, was the 2017 comments that Great Basin Resource requested. And I know there's been some comments from both of you about sit down, and how that's a good idea to sit down with all the parties. And I will just say, and some of the witnesses touched on this, that there was a whole process for this. There was a comment period -- Great Basin Resource Watch had comments. There was also meetings to discuss those comments. The mining company was there, we were there, NDEP was there, and Great Basin Resource Watch was there to articulate some of the concerns.

So there is a -- there is a process in place with the comment period that already exist. NDEP takes it seriously, NDEP addressed those comments in its own response to issue the permit, and it also made several changes. Because like you all said, Great Basin Resource Watch in many ways is an ally to the State which is the environment. And NDEP takes it concerns very seriously.

So it went through the comments, found the ones that it agreed with, and made those changes to the permits. And I think that's the collaborative process that you are all talking about, and it worked here. And the mining plan is not stagnant. It's going to go forward and there's going to be updated rocks and updated models, and there's going to be more opportunities likely for Great Basin Resource Watch to comment again with renewal -- renewed permits. So the process worked, in my -- I think, and the process will continue.

GANS: I think it was admirable that the State says, well, look we'll look at this and -- when we reach the groundwater level -- and then see what we need to do. My concern is will we really have enough additional information then that we don't have now. I'm not say we won't. My question is, will we? And if we're going to do it then, why not do it now? I think you've -- you've to me kind of admitted yeah, that's not a bad idea. Let's look at this and see where it's going or what's going to happen or if we need change it. I agree with that wholeheartedly. And I don't -- and I don't agree to give them another shot at a hearing at that point. I agree you with you on that.

But if you can do it then, unless you -- unless there's some convincing evidence that there's going to be more substantial evidence, do it now.

PORTA: Can I respond to that? So -- and I will just point you to the EPA article, which I brought up during my cross-exam of Mr. Hadder. And that article, which they cited to in their own comments, stated that the best approach is to continue doing sampling throughout the course of mining.

The best approach isn't just, you know, get a lot of samples and then get the permit, go on their merry way. It's to continue. You get enough samples that you have very good idea of what's going to be in there, and then you continue to collect samples as it goes on to confirm that. And if it does not confirm it, then you have mechanisms in place which regulation provides for and the permit provides for to make changes. But it's not realistic to require a set amount of samples that need to be taken, and their own literature that they cited to admit that. It says you need to keep sampling throughout the course of the mine.

GANS: Can I ask both of you to respond to this question? And I'm more curious than anything else. How did you interpret or what did you hear in the EPA comments with the Appellant?

ARMSTRONG: I heard in the EPA comments that they had serious concerns about the groundwater and that there may be long-term monitoring that was going to be required for it.

GANS: Yeah.

PORTA: From what I've read of the -- are you referring to the EIS that was completed? So what I read from that was that the pit lake water quality was examined very sufficiently, and there was an appeal process on that EIS. And it went to the Ninth Circuit, and the Ninth Circuit said there was a requisite hard look on pit lake compliance. It did overturn on that issue. They found that there were some issues related to air quality which are unrelated to this appeal that it sent back down the district court judge. But it said that a hard look had been completed on pit lake compliance.

GANS: So what you're saying is, in your opinion, the EPA concerns -- and I think I read the EPA concerns to the way the Appellant just explained it. But your opinion is those concerns have been addressed in the court system.

PORTA: My opinion is that the permit that has been crafted by NDEP issues or -- I'm spacing on the word -- the permit that NDEP issued addresses those comments by the EPA and allows for continued analysis of groundwater -- of water quality within the pit lake.

GANS: Any comments by the panel?

PORTA: I guess to get back to the certainty. You know we could look at this thing a hundred different ways. We could do more sampling. But before they dig that first bucket of dirt, we're not -- I mean, there's no guarantee. All we can do and the Division can do is the best in their ability with the tools that they have at hand to make these calls. And I feel they have done that.

GANS: I can't argue that point. When I look at the law, everything that's been presented -- did you go far enough? I don't think so. Personally, I don't. Okay, you could've gone further. But how far do you go? I can't -- how can I tell you need to go further when I don't know what further means. Because I think, again, the Appellant brought up some really good points. So -- but you did your job.

PORTA: And some of which the Appellant -- and I agree with their -- you know, about these issues of water quality in pit lakes. But again, that is way above this permitting process, and way above our pay grade; that needs to be discussed later. And I would certainly encourage those discussions to take place at the legislative level and whatever comes of that, regulate -- you know, statutes if they do come forth and it'll be our job to do the regulations under those statutes. But for this purpose, you know, it's -- to me it's not relevant to our hearing and what we're trying to decide today.

But again, I just go back to the crystal ball and I asked both the witnesses for the Appellants and the State about the certainty and, you know, there's a certain level of certainty with error; but again, there's no guarantee what we do.

And whether you're bring in a third party, whether you rerun the model with additional data, I -- I -- you know, maybe it tunes it a little bit more. But until we start finding out what's in the earth and sampling that and running it through the test, we don't know at this -- and I don't know how we can direct the Division to do more work that would get us to a point where we can say, okay, we feel a lot more confident about this potential pit lake water quality -- until we're actually there. And that's sad. I wish it wasn't that way, but I think it is based on the technology and information we have today.

ARMSTRONG: I think that's kind of cold comfort, though, when we were talking about the potential for long-term, widespread environmental degradation. And there is the risk of that, but I think that nobody would disagree with that. But that's in the record. The question is -- just from speaking for me is -- have we done all that we can to -- to address that and mitigate it? And when you have discussions like this about the coverage and the adequacy of the base layer, and you've got comments from Dr. Miller that he can't identify a good -- a good Rhine model result in predicting the amount of sulfide emitted. It's by a magnitude of two, three, or ten how much sulfide more there is than was predicted. It doesn't give me a lot confidence, let me just put it that way.

Was this an arbitrary and capricious action? No. No. And if that's the standard, it was not. But could this have been better?

PORTA: I wish it could be. But I don't see anything out there right now that could get us to a better place, in my opinion.

CAVANAUGHBILL: If I may. The three standards -- and the second standard is was it clearly erroneous in view of the reliable, probative, and substantial evidence of the full record? And I would argue, you know, with Dr. Miller's testimony, but then also with the information on pit lakes; I mean, the agency's aware that there is really no good model, and yet we keep approving these mines. We keep approving these permits. You know, I think it was Chairman Gans who said, you know, it's time to have this conversation. But I think based on that standard, the permit could be denied.

And then we have -- I mean, this -- I think this is clear. I mean, you've got areas that are uncovered here and you're going to be putting -- piling up acid rock, 26 percent of all the tailings from this mine are going to be acidic. They're all going to go in these rock piles -- or waste truck, sorry -- waste truck.

So, you know, you put that out there. You approve the permit. It's the community out there that's going to start feeling those impacts. Maybe not for a little while, but they're going to feel them. And that's what this process is about, to make sure that if the agency has got this kind of information, they've got the information on the problems with the pit lakes. Even if it's larger than this one issue, we all are kind of recognizing there's a problem.

And yet we keep permitting instead of asking even -- I don't think that Great Basin Resource Watch is asking for too much. I mean, they're asking, you know, verify how we got the pit lake quality analysis.

You know and looking at the oxygenation issues with regard to pit lake. Can we long-term plan for these pit lakes? Are there other options? And it's the permitting process where we can do that

You know, in some ways I have a lot of respect for the agency, but I think in some ways they've gotten used to doing that. The way they've been doing it, everyone kept talking about standard science, what's the recognized? Well, we're recognizing there's a problem here.

GANS: And I don't disagree with you, Julie. That's why I said I agree with Dr. Miller that maybe we do need to do this -- address this a little more in depth. I also listened to Tom about okay, but he started doing designated beneficial use and holy cow.

PORTA: Yeah, well I think, correct me if I'm wrong, but even Dr. Miller on the redirect was talking about those zones that have been created of error, that there is no good way to figure out what's going to leach out of that section. So how -- you know, how can we even do anything with that? It's -- it's --

GANS: Julie, you -- you know, I understand what you're saying about is it substantial. Frankly, I think it is substantial. And if it's not, I'm not sure what the Appellant is asking us to consider except more studies, more models, more, you know, go, go, go, and then I have to go back to Tom and say, there's no guarantee. So how far do you go with this? See, my problem is I don't take exception to what you're saying. I don't know what further means. And I agree with Tom that there's no guarantees. There's just no -- I mean, listen to all the witnesses. Nobody wanted to guarantee anything. They said well, we need more information. Well, we need to do this. Well, we need to do that. But what's further? So while I agree you, I don't know how we go further, what we do at this point to go further and do more when I really believe that they met the law. That's -- that's my quandary.

I agree with you that I would like to see more information. I'd like to see a little bit because my -- my opinion is these pit lakes -- or at least a lot of them have been disasters. They did go belly up, in my opinion; and what little bit that I know about it.

Are we doing better? Yeah, I think we are. I think that's what the witnesses were telling us. Yeah, we're doing better. We're not there yet. So we're in kind of this never, never land about where we used to be and we're not where we want to be, but here's where we are. And that's why I'm so, so conflicted about this whole issue.

NUBEL: And I can please just offer a response to Julie's argument?

GANS: Sure.

NUBEL: So there's been several references to the idea that there's no successful model, and that Mr. Miller brought that up. But that testimony did not go unrebutted. Brent Johnson came on the stand and said that he's personally worked on mines and these pit lake models, and that he's had several successful models. They're not all complete failures. It's just that for the ones that he's worked on because mining takes so long, you don't always have -- you can't immediately identify whether or not the modeling is correct or not. So it takes time for the pit lake to fill up and see how you did.

So we showed through Brent Johnson that there are successful models. They're not all complete failures. You can cherry-pick some. You can take some that look really bad or you can take some that look really good. But the burden is ultimately on them to show well, if you're going to say that every single, you know, mine that's based on this model is a failure, then they should've gone more in depth into discussing the pit lakes that they're looking at.

All they say is that these pit lakes were failures. They don't go into analyzing what data actually went into those pit lakes. They don't go into why those were failures. They just offer generalized testimony that well, this model hasn't worked before. But really what we're here to decide is whether this model was appropriate and whether NDEP abused its discretion in light of the evidence that was presented in front of it.

GANS: Right. And I think, Dan, there was evidence presented. And I heard Mr. Johnson and what he said. Yeah. His opinion is probably about as good as we got. Probably good as we can do. And you know if this -- if this pit lake was 100 yards across, I'd say ah-ha, okay. This pit lake is a mile across. This is not a small project. That's where I kind of put the brakes on myself.

Man, this is a big, big pit lake. And if something goes wrong with it then we -- we better really careful.

PORTA: But I can take somewhat a little bit of comfort in the fact that, you know, today's decision is not going to end this -- this process with the permit and with sampling and continued evaluation and analysis. I mean, what we decide here today, that's it, you know, it's over and we all walk away. Again, continued sampling, continued analysis, continued work with public and Great Basin -- I -- I -- that gives me some level of comfort that I can accept.

NUBEL: And if I could just correct one thing. So when we talk about the one mile wide for the pit, we're talking about the actual mine pit being one mile wide, not the lake. So if you think back at Dr. Olsen's testimony where the filling stage is, the filling stage is going to be substantially smaller than a mile wide. It's just the pit itself where the mining take place.

GANS: Thank you.

PORTA: You're not going to be able to throw a rock across the canyon.

GANS: Well, I don't want to beat a dead horse. Is there a motion that the panel wants to make here?

PORTA: Well, I'll move that we uphold the decisions -- or the Division's decision to issue the permit for the Mount Hope Mine, and that they did not act in an arbitrary or capricious manner based on the information that we received today. Okay. We got those? Okay. Good. So I probably need to go down through all three of these since this was the basis for the appeal.

So as to the first point, the final decision was affected by error in law. I did not see anything presented today to me that would show that, and I so I feel the Division acted appropriately and did not err.

Number two, the final decision was clearly erroneous in the view of the reliable, probative, and substantial evidence on the whole record. I feel again, the Division did not make an erroneous error; and, therefore, I would affirm that they upheld their responsibility.

And the final decision was arbitrary and capricious or characterized by an abuse of discretion. And again, based on the witnesses that were presented by the Division, I do not feel that they abused -- or were arbitrary or capricious or abused their discretion in this manner. Is that it? Okay. Thank you.

GANS: Okay. There's been a motion made. Is there a second on the motion? I can't second a motion.

ARMSTRONG: No, you can.

GANS: I can?

CAVANAUGHBILL: Yeah, you can.
GANS: I thought I couldn't.
PORTA: You're the man.
GANS: Maybe the second one.
LANDRETH: I'm not going to, so -- yeah.
GANS: I will second the motion. So now there's a motion on the floor. It's been seconded. Before we go any further, I want to know if there is any discussion -- any other discussion or comments from the panel on the motion?
LANDRETH: My vote is going to be determined by the fact that I agree with (indiscernible) that they could've gone further, that time was not pressing on this. And they could've -- there could've been an opportunity to go further and reach a resolution on some of the issues that had been raised and not, in my opinion, rebutted.
PORTA: Would you care to offer us an amendment?
LANDRETH: Well, I thought about that and I guess I -- I would be interested in offering the amendment, that if the parties thought there was any opportunity to sit down, and we try once again to resolve some of the various specific concerns that have not been addressed by the State, would they be willing to do that.
CAVANAUGHBILL: That would be pursuant to an order from the panel? It would have a little --
GANS: It would part of the motion.

PORTA: If it was amended.
GANS: Yes, if it was amended.
LANDRETH: In good faith.
CAVANAUGHBILL: Yes, Great Basin Resource Watch would be willing to do that.
LANDRETH: Okay. That would be my amendment then.
ARMSTRONG: So if there's an amendment then you're modifying the -- okay -- because you can affirm, which he -- that this motion on the table was --
PORTA: Affirming there being --
LANDRETH: So modifying the permit, I guess, we -- right?
PORTA: Well, let's ask the State whether their -- I mean the -- that they were amenable. How about the State?
ARMSTRONG: Discuss it.
PORTA: Okay.
NUBEL: Can I have one minute, please?
PORTA: Sure. Sure. Yeah. Yeah.
CAVANAUGHBILL: So would that -- does that say (indiscernible).
PORTA: I don't know it's really tough.
GANS: So Tom and Kathryn, let me -- let me make sure that I just put up -- I don't really want to modify this permit. I would really prefer not to.
LANDRETH: Okay.
GANS: But I like where you're going. So I'd have to ask our attorney to see where we can go with that in what you're saying.

RASUL: So basically the options are affirming the decision, modifying it. This is pursuant to regulation or reversing it. Modification would, you know, require that the State review them, go back and make changes to the permit with whatever changes you recommend.

But the other option is that you can affirm as -- this motion as it stands right now, and then just make recommendations for them to put together --

PORTA: Or we could direct the Division.

LANDRETH: Can we direct them to it?

RASUL: Yeah. As recommendations. But it wouldn't part of the stipulated (indiscernible).

PORTA: And we've done that, I think, in the past -- other decisions by this body.

GANS: We've made recommendations to NDEP. Okay, affirming it. But -- but we want this consideration. We want this (indiscernible).

PORTA: Yeah. Yes. And we've asked them to report back.

GANS: Yes. So that would be your amendment to the motion, Kathryn?

PORTA: Well, would that be acceptable to you without amending the motion, yeah. If we did that, we affirm the Division's actions, but then directed the Division to work with Great Basin to resolve some of these issues and come back to us at a later date.

LANDRETH: Do they give them a set date?
PORTA: See what's worked out.
LANDRETH: I'm curious what the State has to say about this.
NUBEL: Sure. And so I think that process is laid out very well in statute and --
GANS: Dan, of course, you do. Who do you represent? You're an attorney. You're an advocate.
NUBEL: I think that any decision on your -- on the SEC's part to either modify or to remand the permit is a conclusion that NDEP acted to abuse its discretion in clear error of law, or in ignoring reliable evidence. And I don't think, based on the evidence here today, that that would be an appropriate decision to be made.

So I would suggest that you affirm a permit and if there are suggestions or recommendations after, then I know that NDEP will take those seriously. And they've already showed a strong willingness to discuss these issues with Great Basin Resource Watch. They've met with them twice, they did a response letter, and they would take your recommendations very seriously. But this permit is supported by the evidence, and I would suggest that you affirm it.
PORTA: What do you think?
CAVANAUGHBILL: Well, I don't know where that really leaves us. Is it a recommendation to the two parties that

they get together and try to resolve this? We can be strong with --

PORTA: Well, I think we can -- I think we can direct the agency basically that -- do what we think they should do. So -- and I think -- and based on history, the agency has always responded to our suggestions, directions, and then come back to us and reported. So I don't think there's any cause for concern if we did, that that wasn't going to happen.

GANS: Agree.

ARMSTRONG: Do you have a response?

CAVANAUGHBILL: I recognize that how this committee has to -- or commission has to determine under the law the standards, and that we've got two members out of three, at least, that don't feel like we've carried that burden -- because the burden is on us, as Mr. Nubel said.

But one other thing -- and Great Basin Watch would welcome the opportunity to sit down and work further. I think everyone learned a little more about each other's position after today, as well. So that's helpful. But another thought, just looking at the bigger picture, and it sounds to me like one of the stopping points is that we don't have adequate protections under the law in terms of governance and water quality standards when it comes pit lakes.

So that's a concern. And I don't know if it's within this commission's authority to, you know, go back to the full body and start a working group on it, look at legislative proposals to address a comprehensive study of pit lakes in the State of Nevada; anything along those lines.

But we would also be very willing to work with the commission on that, as well. Because it sounds to me like even if there's another permit, the same issues are raised because of the way the standards are in law right now. It's very, very difficult for anyone to really truly raise these overarching concerns about long-term viability of pit lakes in Nevada.

GANS: And Julie, that's essentially what you just said was what Dr. Miller said.

CAVANAUGHBILL: Wow, I'm learning.

LANDRETH: Well, I think there's some agreement from the State on those issues, too. I can't speak for the (indiscernible).

PORTA: Oh, yeah. And there's a process in place for Great Basin Resource Watch to propose regulations and regulation changes. And also I know that they are -- based on the research I've done -- very familiar with the Nevada legislature. And they've proposed several bills before. And that is another element where that dialogue could occur. And I'm sure NDEP would have input on those changes, as well.

GANS: I guess we have a motion on the floor and we are looking at an amendment, or at least an addition to that motion. I guess the motion stands the way it has been affirmed without trying to change the permit. But we are also wanting to add to that motion, then, some direction.

PORTA: Well, I think we need to do it after the fact, correct?

CAVANAUGHBILL: I think so. I think that would be cleaner.

GANS: It would.

PORTA: Yeah.

LANDRETH: But my concurrence with the motion is contingent upon the direction.

PORTA: It depends on the direction. Can we make the direction before we vote on the motion?

GANS: I can see your hesitancy.

PORTA: Would that be appropriate or not?

RASUL: You could, yeah. Because it's on the record if they agree, I think you're fine.

PORTA: Okay. Okay. So if you want to, you know, have at it.

LANDRETH: There's a lot in this direction. I guess it's to have the parties confer and try to resolve the outstanding concerns that were raised and not satisfied --

PORTA: Surrounding the modeling.

LANDRETH: -- surrounding the modeling. And the facility planning.
PORTA: Oh, okay.
LANDRETH: So we've got a couple of issues, at least. And then in addition to that, begin to work on some proposed legislation and regulation concerning enhanced -- protection of water from mining. Does that cover it?
PORTA: I think so. That's good enough with me.
GANS: I support that.
LANDRETH: Okay. That's the direction.
PORTA: Okay. And what's the State's --
NUBEL: I -- I just want to be clear that, obviously, NDEP would listen to any direction given by this panel, but that would not open any further opportunity for another appeal based on those discussions, and that this appeal will be completed to the extent that the motion after this comes to our decision.
PORTA: Yeah.
GANS: Well, that would be my intent. Probably my understanding.
LANDRETH: Yes.
PORTA: Right.
LANDRETH: But would not preclude judicial review? I mean, we don't have control over that. Yeah. We don't have control over that.

PORTA: And we would like then, at some point in time, a report back on this since there is no appeal. But we want the Division --
CAVANAUGHBILL: Like a status.
PORTA: Yeah, a status. Come back and tell us how is it going? Are you guys still, you know, at odds with the modeling and so forth? So we have some sense of if it went well or not.
NUBEL: So just to be clear, it would be to discuss some of the concerns brought up by Great Basin Resource Watch today related to the modeling.
PORTA: The error in the modeling.
NUBEL: And two, would be to discuss the (indiscernible) --
PORTA: The PAG situation.
NUBEL: -- PAG situation. And three would be to discuss potential changes to the legislative.
PORTA: Future legislation for beneficial use.
LANDRETH: Beneficial use. Pit lake modeling. The pit lake water quality analysis, the testing, and the facility structure -- the PAG. And if I may?
NUBEL: And to engage in good faith discussions regarding this issue.
CAVANAUGHBILL: Sure. Yeah.
NUBEL: Yeah.
PORTA: No, don't do it in good faith. Only if you're a consultant.

CAVANAUGHBILL: And to begin to work on proposed legislation and regulation. Is that specific to pit lakes?

PORTA: Well, I think -- I think, you know, you need it. I'd hate to use this term, but test the waters out there to see, you know, if that's actually going to fly with the legislature. And, you know, what type of support you might get. I mean, having been in the business 30 years, very sensitive subject, but I think it's worth the start of the discussion and how you might proceed. Is legislation warranted? Can it pass, you know? Do you have the support? That type of thing. Go from there.

NUBEL: Right. And to be clear, NDEP would not be committed by this direction to come to a determination about what legislation should or should not be introduced. Rather, it would just be to engage in an open dialogue.

PORTA: Right. And then we'd like to hear the results of, you know, pros and cons of moving forward with, or not moving forward with the beneficial use standard for lake pits (sic).

GANS: Yeah, okay. I'd like to know you're not going to torpedo it. We need something written down. Were you writing something down, Julie? I want to make sure that you're very comfortable with what we're doing here and the three items. I'd like to have them written down by Dan, Julie, make sure we got the right language here that we're all working on together. You've already got it, Katie?

ARMSTRONG: I got it.

GANS: Will you read it to us?

ARMSTRONG: Sure. So there was the initial motion to uphold -- to affirm the permit as written. And then there was the recommendation that the parties confer and try to resolve surrounding concerns of the permit relating to the error in modeling, the PAG situation that we have the wrap-up there on, and open a dialogue about changes to legislation regarding pit lakes and engage in good faith discussions regarding this issue. Report back to the SEC.

NUBEL: Specifically, beneficial uses of pit lakes and if it's warranted, I think.

GANS: Did you get that? I want to make sure.

CAVANAUGHBILL: The only I didn't hear was anything about the pit lake water quality analysis -- the error that Mr. Kempton talked about.

ARMSTRONG: The error in modeling.

CAVANAUGHBILL: Oh, I thought you -- air like the air you breathe. Okay. Yes, that sounds good.

GANS: So we need to first of all address the motion. It's been moved and seconded. I want to make sure there's no further discussion or comments on that motion.

Okay, and with that I will ask for all those in favor signify by aye.
IN UNISON: Aye.
GANS: Opposed? None heard. The motion here is unanimously. And now secondly, we want to give the direction to NDEP on those three items that Katie just read to us. And do we vote on that too?
IN UNISON: No.
PORTA: It's on the record.
GANS: Good. Okay.
ARMSTRONG: They're just recommendations.
GANS: Okay.
CAVANAUGHBILL: And with respecting to giving -- providing a status, how soon does the panel want that?
GANS: We want you to come back jointly. Whatever. When do you report back?
PORTA: What do you think would be a reasonable time frame for getting back to us?
NUBEL: Do you mind if I have a second to discuss?
PORTA: Sure.
CAVANAUGHBILL: There's a meeting in October.
ARMSTRONG: Six months.
NUBEL: Does the parties here agree that six months would be an appropriate time to --
PORTA: So the first of the year.
GANS: Okay. Six months. And I'll be reminding them. Okay. With that, we can get on to our last item

on our agenda, which is final public comments. I want to remind participants if they want to comment, that they're limited to -- limiting their time. It's late. I wanted to know of more action may be taken on the matter by reading the public comment until the matter itself has been included on an agenda for possible action at one of our meetings. So with that, I would entertain anything from the public. Anybody want to speak, please.

BAILEY: I do.

GANS: Come over here. We want to make sure that we get who you are and where you're from on the record.

BAILEY: My name is Carolyn Bailey. Our family owns the closest property to the mine site in two directions. And I wasn't going to say anything today. I usually am very careful about my comments and -- but just after listening today, I think I would like to make a couple of comments.

One, is that there's been a little bit of tongue in cheek discussion about bias in legal representation, and studies and engineering practices, best available data, that type of thing. And our family originally tried to appeal the water pollution permit for Mount Hope. We got so far, and realized that we're financially incapable of doing so. Our family has been ranching in Diamond Valley since 1863 with seven generations.

But we financially cannot -- we got to the point of almost to the brief, realized it was going to be too expensive to try to have a voice in the process. So our attorney asked if she could just finish the brief and file it, and she did, and that was back in the original first permitting process.

And since then, we haven't been able to say anything because we can't afford to. But we are the neighbors of the mine. So it will definitely impact us personally. So without my tongue in cheek -- well, with my tongue in cheek, I would say that it would've been really nice to have an attorney here representing our family with a bias towards our interests.

A couple of issues that -- that I'm concerned about -- water quality is how many gallons of water will be lost due to -- lost to beneficial use due to being degraded? We haven't talked about how many gallons of water would be in the pit. And I have some videos on YouTube that you can look up about flash floods in the Garden Pass area, which is where the PAG area would be stacked in the Garden Pass side. I could show you where we live, where our ranches are, where our farm is, but I know we all want to go home, so I won't bother to do that for you. But I do have videos on YouTube and most of them are titled Mount Hope Flash Flood with my name, Carolyn Bailey. And they'll show water coming down through Garden Pass right by the PAG area, and right by the mine site, coming into Diamond Valley.

Anyone who looked at a satellite image could see the alluvial fan at the bottom of that pass where the water washes down there. So I think the answer to that is kind of in that picture up there that the water will be captured and sent to the water dump area in Colby Valley from Diamond Valley.

So that water that usually flash floods into Diamond Valley is what -- we're the closest neighbor. So that's our recharge water. So again, my question is how many gallons of water are we losing in the pit lake and in these -- and in capturing this water from the slag piles due to degradation of water quality?

So those are just a couple of my concerns that were brought to mind today. That's -- that's -- I wasn't planning on saying anything, but I will stop there.

GANS: Wait a minute. Has any of these concerns ever been brought to light to staff before?

SCHULENBERG: Can I answer that?

GANS: Yes.

SCHULENBERG: So the original (indiscernible) to that. I saw your original comment. I also looked you guys up.

BAILEY: Did you?

SCHULENBERG: Yeah. And I can see the flooding (indiscernible).

BAILEY: Uh-huh.

SCHULENBERG: I can't give you a specific number for, you know, how much water could be lost due to collection, stuff like that. But I do know, (indiscernible) which is designed to carry 1,000 CFS. (Indiscernible).

BAILEY: That's a lot of water.

SCHULENBERG: Yeah.

GANS: Is it really a recharge water, though? I mean, there's a question she's bringing up, I understand. I'm not positive that all of that water would end up being recharged.

NUBEL: And I would just clarify that NDEP's purpose is to look at water quality, whereas the out-of-state engineer looks at quantity of water, which is a lot of discussion here. So -- and I know there is a permitting process with the Nevada State engineer for this project. So those concerns also would probably be more applicable to that permit.

GANS: And Dan, I really appreciate that from the standpoint that every member of the public -- and you work in this government bureaucracy. You know this stuff; they probably don't. They don't probably know where to go or who to see or who to talk to or get answers from. So that -- whatever we can do, I would really request that either you get with her or she gets with you and give her some guidance, if nothing else, so she knows what the deal is. Ignorance breeds fear, in my opinion; and we just don't need that. So I would like you to follow up with somebody in NDEP unless you -- you don't need an attorney to do this. It would just be answering your questions.

BAILEY: Well, with my tongue in my cheek again, it's my understanding that the water is being captured because of the pollution permit. So the water would be lost because it's being polluted. So that's why I bring it up today. And if it's being captured and taken out of the valley and our valley is right now in a critical management area for water because we're already over-appropriated; here's a mine that not only has a huge consumption of water, but also then will degrade water in the pit -- in the future pit.

And as you say, the pit will be terminal. So since I'm the closest neighbor, does that mean my water is going towards the pit? How much water are we losing in a critical management area because of this mine project, when we're already -- when we already have a problem? I guess that's my concern.

GANS: So you're asking questions you would like some answers to. Is that what I'm hearing you say?

BAILEY: I would love some answers.

GANS: Okay. Then you will get answers. So we can ask NDEP -- at least start that process and get you to the right people and give you those answers.

BAILEY: Okay. Thank you. And I have submitted comments in the EIS, and we did submit the one brief, although we had to back out for financial reasons with the first pollution permit. But -- and I appreciate all the time everyone here has put into it and the State and the State engineer's office, and Great Basin Resource Watch, especially. I appreciate everyone's concern because I believe that we all have the same goals in mind. I really do. I think that we all want clean water in Nevada. So thank you.

GANS: You're welcome. Thank you for coming up and making comments. Is there anyone else in the audience that wants to make comments?

Don't leave until you have a contact, okay?

BAILEY: Okay.

GANS: Okay.

BAILEY: Sure.

GANS: I see no one else that wants to provide any public comments. So with that, we will close this hearing.

(Recording concluded)

CERTIFICATE

I, Katherine E. Schlappi, a court approved proofreader, do hereby certify that the foregoing is a correct transcript from the official electronic sound recording of the proceedings in the above-entitled matter, to the best of my professional skills and abilities.

Katherine E. Schlappi

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KATHERINE E. SCHLAPPI   October 7, 2019

Proofreader