

STATE OF MICHIGAN

STATE OFFICE OF ADMINISTRATIVE HEARINGS AND RULES

In the matter of: File Nos.: GW1810162 and
MP 01 2007

The Petitions of the Keweenaw
Bay Indian Community, Huron Part: 31, Groundwater
Mountain Club, National Discharge
Wildlife Federation, and 632, Nonferrous
Yellow Dog Watershed Metallic
Environmental Preserve, Inc., Mineral Mining
on permits issued to Kennecott
Eagle Minerals Company. Agency: Department of
Environmental
Quality

Case Type: Water Bureau
and Office of
Geological
Survey

HEARING - VOLUME NO. 42 (XLII)

BEFORE RICHARD A. PATTERSON, ADMINISTRATIVE LAW JUDGE
Constitution Hall, 525 West Allegan, Lansing, Michigan
Wednesday, August 6, 2008, 1:00 p.m.

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22
23
24
25

TABLE OF CONTENTS

PAGE

SURREBUTTAL WITNESSES: INTERVENOR

STEPHEN V. DONOHUE, PH.D.

Direct Examination by Mr. Lewis	8481
Cross-Examination by Mr. Eggan.	8493

TRACEY JANE ARLAUD

Direct Examination by Mr. Predko.	8500
Cross-Examination by Mr. Wallace.	8512
Cross-Examination by Ms. Halley	8529

1
2
3
4
5
6
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8
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10
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14
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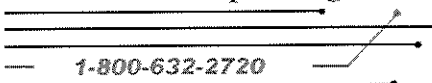
EXHIBIT INDEX

PAGE

IDENTIFIED RECEIVED

Petitioner's Exhibit 31-47.	8535
(Mercury Air Concentrations in Northern Nevada)	
Petitioner's Exhibit 31-48.	8535
(Response to Nevada by Dr. Glenn Miller)	
Petitioner's Exhibit 31-49.	8538
(10-28-03 letter from Nicolet Minerals Company to the Wisconsin DNR)	

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1 Lansing, Michigan

2 Wednesday, August 6, 2008 - 1:04 p.m.

3 JUDGE PATTERSON: Are you ready to proceed?

4 MR. LEWIS: Yes, your Honor. I think we have to
5 do a dial-up. We have Steve Donohue first, your Honor, to
6 be followed by Tracey Arlaud.

7 JUDGE PATTERSON: I think probably he should be
8 re-sworn due to passage of time.

9 REPORTER: Do you solemnly swear or affirm the
10 testimony you're about to give will be the whole truth?

11 DR. DONOHUE: I do.

12 STEPHEN V. DONOHUE, PH.D.
13 having been called as a surrebuttal witness
14 by the Intervenor and sworn:

15 DIRECT EXAMINATION

16 BY MR. LEWIS:

17 Q And you're the same Steve Donohue who testified earlier in
18 this proceeding; is that right?

19 A That is correct.

20 Q Mr. Donohue, as you know, I've asked you to testify today
21 directly in response to a specific piece of Dr. Prucha's
22 testimony on behalf of the Petitioners, which testimony was
23 given on Wednesday, July 16, 2008, and specifically
24 concerning Dr. Prucha's statements about the water treatment
25 system for the Crandon Mine and more specifically what he

1 said about the DNR requiring additional capacity beyond what
2 Foth had designed. Have you reviewed Dr. Prucha's testimony
3 on that point?

4 A Yes, I have.

5 Q I'd like to read that section of his testimony for the
6 court's reference and yours as well starting on page 8375 of
7 the Wednesday, July 16, 2008, transcript, Volume XL, at line
8 15. Question: "Before we get to your conclusions, I do
9 have a question for you." And this is the examination of
10 Dr. Prucha, Mr. Donohue. Continuing:

11 "One of the witnesses, a Mr. Fassbender, who
12 testified in this case and who has done some work
13 related to a project in Wisconsin related to the
14 Crandon Mine, testified he couldn't recall some
15 information pertaining to the Crandon Mine related to
16 inflow that was predicted for the Crandon Mine. Did
17 you have an opportunity to review materials pertaining
18 to inflow at the Crandon Mine?"

19 Answer: "I did." Question: "What did you review?"

20 Answer: "The discharge permit application." Question:

21 "Okay. What did you learn from your review of those

22 materials pertaining to input in the Crandon Mine

23 specifically pertaining to predicted inflows?" Answer:

24 "Well, my understanding is that a base case and an
25 upper case inflow were estimated by the permit

Page 8482

NetworkReporting

1-800-632-2720

1 application permittee, I guess, and that was submitted
2 and apparently that wasn't -- the base case and upper
3 bound estimates for the flow weren't high enough. And
4 so I guess the values of the inflow or for discharge
5 purposes were increased by a required increase by
6 the --"

7 Question: Do you remember what the predicted inflow was?"

8 Answer: "I believe it was in the 400 to 800 range,
9 something like that, and then they used 600 gallons per
10 minute, I guess, as a design basis." Question: "And what
11 did the Wisconsin Department of Natural Resources require?"

12 Answer: "In the end, 1500 GPM is what I believe I saw."

13 Question: "Okay. So they were predicting between 400 and
14 800, yet the Wisconsin Department of Natural Resources
15 required almost twice as much, 1500?" Answer: "That was my

16 understanding." Question: "Okay. And do materials you
17 reviewed indicate who was it -- who it was or what company
18 it was that prepared the input data for that particular

19 matter?" Answer: "I believe it was." Question: "At the
20 Crandon Mine?" Answer: "I believe it was Foth & VanDyke."

21 Question: "Okay. And did you happen to notice who the
22 professional hydrologist was that essentially signed or
23 stamped those documents for the Wisconsin study?" Answer:

24 "I think there were three different engineers." Question:

25 "Was one of them -- was one of them Stephen Donohue?"

Page 8483

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1-800-632-2720

1 Answer: "I believe so. Yes." Now, is that the testimony
2 you reviewed, Mr. Donohue?

3 A That is correct.

4 Q To start with, would you please explain Foth & VanDyke's
5 involvement in the discharge permit application and the
6 preparation of the design plans for the water treatment
7 system for the Crandon Mine?

8 A Certainly. We were -- Foth & VanDyke was the prime
9 consultant for the Crandon Mine project and, as such, we
10 were tasked with a number of activities including the
11 coordination of groundwater studies, geochemical studies.
12 Part of the groundwater studies were to estimate how much
13 water was going to flow into the potential mine opening as
14 well as for the geochemical studies what the water quality
15 would be. That information was synthesized into the water
16 treatment analysis needs for the project, which was a task
17 that we led. And based on the inflow and the water quality
18 characteristics and et cetera, we designed the water
19 treatment system for the project at a design basis of about
20 600 gallons a minute.

21 Q And what was your specific role in that process concerning
22 the water treatment system?

23 A My specific role at the time was to -- I was the coordinator
24 of the groundwater team that completed the investigations of
25 the hydrogeology at the site as well as the groundwater

Page 8484

NetworkReporting

1-800-632-2720

1 modeling folks who completed the modeling analysis to
2 examine inflow into the mine.

3 Q Was Dr. Prucha involved in that process at all that you're
4 aware of?

5 A No, he was not.

6 Q Was he involved in the Crandon Mine permitting process
7 whatsoever that you're aware of?

8 A No, he was not.

9 Q What time frame are we talking about here that this
10 application process took place for the proposed Crandon
11 Mine?

12 A Well, there were essentially two different permitting
13 efforts that we were involved in, one from approximately
14 1993 to '98, and then again from late '98 to 2003 there was
15 a change in ownership of the project during that period of
16 time that led to the two different permitting efforts.

17 Q And was your company's involvement through both of those
18 efforts?

19 A That is correct.

20 Q Who was the owner of the -- or the owners of the Crandon
21 Mine deposits?

22 A Initially in 1993 there was a joint venture that was formed
23 between Exxon Minerals Company and Rio Algom out of Canada.
24 They formed a mining company called Crandon Mining Company.
25 They owned the project and were working on the permits from

1 '93 until approximately the first quarter of 1998 at which
2 time Exxon sold their interest in the project to Rio Algom,
3 and Rio Algom formed a new local mining company called
4 Nicolet Minerals Company. They revised the project and
5 hence the second permitting effort from 1998 to 19-- or to
6 2003.

7 Q Did either Kennecott or its parent company Rio Tinto have
8 any involvement in the Crandon project?

9 A No, they did not.

10 Q Now, I'd like to -- well, as to Dr. Prucha's testimony, he
11 referred to the discharge permit application, Mr. Donohue.
12 Does the discharge permit application contain any
13 information substantiating what Dr. Prucha said about the
14 DNR requiring additional design capacity?

15 A No. The documentation that was submitted to the state does
16 not reflect that the DNR required redesign of the system.

17 Q Did Dr. Prucha otherwise in his testimony offer any
18 information as to the source of his opinions whether
19 documentary or otherwise?

20 A There was some reference to a document that -- I'm not sure
21 exactly what they were referring to, but I suspect I know
22 what it was. But it was never entered into evidence.

23 Q Is what Dr. Prucha said in his testimony about the DNR
24 requiring you to redesign the water treatment plant correct?

25 A No, it is not. The DNR did not require us to redesign the

Page 8486

NetworkReporting

1-800-632-2720

1 water treatment plant.

2 Q Could you explain what did happen, please?

3 A Well, as part of the DNR's review of the overall project,
4 they came up with a slightly higher estimate of what the
5 inflow into the mine could be. The estimate that we had
6 come up with was between approximately 450 and 775 gallons a
7 minute. And based on that, we elected to use 600 gallons a
8 minute as a design basis for the treatment system. The DNR
9 was comfortable with that design basis for the construction
10 of the project. Based on their analysis, which they pushed
11 the modeling effort to a more extreme condition, they came
12 up with an inflow estimate at 1200 gallons a minute.

13 Q Was that a worst case?

14 A That would be a worst case based on a set of calibration
15 conditions that we did not agree with. But, yes, it was a
16 worst case in their mind. Based on that 1200 -- roughly
17 1200 gallon per minute estimate that they came up with, they
18 asked how we would manage that kind of water volume if, in
19 the extremely unlikely event, that amount of water came into
20 the mine. As a result of that, we elected to submit to the
21 DNR a contingency plan which describes how the mine would
22 have been developed, how the water inflow to the mine would
23 have been monitored, what type of a decision making process
24 would have been used to evaluate the inflow that could
25 potentially lead to an upgrade in the capacity of the water

Page 8487

NetworkReporting

— 1-800-632-2720 —

1 treatment system during operation. Not at the time of
2 construction; this is during operation. And so that
3 contingency plan, which makes reference to 1500 gallons per
4 minute inflow which was a number that was higher than what
5 the DNR was predicting, could go into the mine under a worst
6 case condition was what was used as the basis for the
7 contingency plan again to upgrade the system during
8 operation only if it was needed. That was not the way the
9 system was going to be constructed at the outset.

10 Q And was that contingency plan accepted by the DNR, Mr.
11 Donohue?

12 A Yes. They reviewed that, and there was no other questions
13 that they asked about it. They felt comfortable with it.

14 Q I wanted to ask you, given the numbers you talked about for
15 the Crandon Mine, I believe you indicated that Foth had
16 calculated a range of 450 base case to a 775 GPM worst case
17 whereas, in the Eagle project, according to Mr. Wozniewicz
18 and others, the current inflow predictions are 60 gallons
19 per minute base case and 210 gallons per minute upper bound
20 case. Why was the -- why is the number -- why are the
21 numbers larger in the Crandon circumstance and why is there
22 a larger range of numbers in the Crandon circumstance than
23 for the Eagle project?

24 A Very simply the Crandon project was --

25 MR. EGGAN: Your Honor, I --
Page 8488

NetworkReporting

1-800-632-2720

1 A -- a much, much larger --

2 MR. EGGAN: Hang on; hang on for a second, sir.

3 JUDGE PATTERSON: We have an objection.

4 MR. EGGAN: Yeah. Your Honor, I think we're now
5 exceeding the bounds of rebuttal testimony. I understood it
6 was going to be in direct response to what Dr. Prucha had to
7 testify about. Dr. Prucha did not testify about that issue.
8 And so I would ask that they be restricted.

9 MR. LEWIS: Well, he did. He gave the numbers
10 specifically that were in the Crandon predictions, and
11 that's what we're responding to. His testimony was that the
12 predicted inflow was 400 to 18 (sic) gallons. And he went
13 further to say, according to him, not according to Mr.
14 Donohue, that the DNR required a redesign of 1500 gallons
15 per minute. So that was part of his testimony. And I think
16 it's appropriate to respond to it, your Honor.

17 MR. EGGAN: But he mentioned numbers in the
18 context of Crandon. But he certainly didn't -- he didn't
19 offer a comparison of the Eagle and -- and Crandon projects
20 in terms of, you know, the specific numbers and why the
21 numbers were justifiable at Crandon.

22 MR. LEWIS: Well, it's left there in the record for
23 Petitioners to use for that purpose, your Honor. I think
24 they solicited the testimony. And we ought to be allowed to
25 respond.

Page 8489

NetworkReporting

1-800-632-2720

1 JUDGE PATTERSON: I'll allow. Overruled.

2 Q Do you recall the question, Mr. Donohue?

3 A Could you repeat it, please?

4 Q Yes. I wanted you to explain the reasons that both the
5 predicted inflow numbers and the range of predicted inflow
6 numbers for the Crandon Mine are larger than for the Eagle
7 Mine -- the proposed Eagle Mine?

8 A Yeah. Very simply, the Crandon Mine is a much, much larger
9 deposit. It was a much, much larger mining operation than
10 what is proposed for the Eagle project. The Crandon
11 project, the orebody there is -- from east to west is one
12 mile long. And the depth of the orebody is -- was over
13 2,000 feet deep below the bedrock surface. So very simply
14 we're looking at a much larger portion of bedrock that's
15 going to be mined, and hence there's going to be a little
16 wider range of uncertainty just due to that fact alone.
17 Also the geology of the Crandon deposit and the manner in
18 which that ore deposit formed is different from the Eagle
19 project. And due to those differences, that also
20 contributes to the slightly -- or to the larger range of
21 uncertainty for the Crandon project as opposed to the -- as
22 opposed to the Eagle deposit.

23 Q Now, was the Crandon Mine ultimately ever permitted, Mr.
24 Donohue?

25 A No, it was not.

Page 8490

NetworkReporting

1-800-632-2720

1 Q How far did it get?

2 A Well, at the -- in late 2003, which is when the project
3 ended, it was very close to having a draft EIS issued by the
4 state of Wisconsin, which would have initiated, in essence,
5 a series of proceedings leading to a contested case hearing
6 like this that would have decided the project.

7 MR. EGGAN: Your Honor, I object to this. Mr.
8 Donohue, hang on. Mr. Donohue, hang on. We've got an
9 objection. I object to this. First of all, he has now
10 suggested that the whole thing was all ready to be permitted
11 very soon. We don't have a Wisconsin DEQ person to come in
12 here and testify to that fact. So that is either based on
13 hearsay, is hearsay, is mere speculation on his part. From
14 my perspective, this goes well beyond the rebuttal testimony
15 that was offered by Dr. Prucha.

16 MR. LEWIS: Again Petitioners solicited/elicited
17 testimony from Dr. Prucha specifically about the Crandon
18 Mine. I think to not allow us to wrap up, you know, what
19 happened to the Crandon Mine and the reason for that is to
20 unfairly curtail what we should be allowed to do here in our
21 surrebuttal, your Honor. And that's all this is is a little
22 wrap-up for your edification as to what happened with the
23 Crandon Mine. Petitioners have put it on the table. I
24 think it leaves a big -- either an incorrect implication or
25 it least a gap that we ought to be entitled to fill. And

Page 8491

NetworkReporting

1-800-632-2720

1 this is going to be the end of the surrebuttal if we can
2 finish up this question.

3 JUDGE PATTERSON: I'll allow it.

4 MR. EGGAN: I would only add, your Honor, just --
5 and I understand your ruling. And obviously we'll go on.
6 But this is testimony that -- that, to put it in their
7 phase, could have been offered. We had a number of
8 witnesses who testified about the Crandon Mine well in
9 advance of this surrebuttal testimony and could have been
10 responded to at that time. And so now we're -- you know,
11 we're left with do we want to respond ourselves.

12 MR. LEWIS: Did we have a ruling?

13 JUDGE PATTERSON: I overruled.

14 Q Mr. Donohue, again I think you explained how far it got in
15 the permitting process. And then what happened? Why was
16 the permitting process ultimately not concluded?

17 A At the tail end of the project, there were two Native
18 American tribes who had reservation properties very close to
19 the project. They also had casino operations. One operated
20 out of Milwaukee. They had the financial wherewithal to
21 purchase the project the owners and did so.

22 MR. LEWIS: Thank you, Mr. Donohue. That
23 completes the direct exam, your Honor.

24 MR. EGGAN: I do have a few questions, Judge.

25 JUDGE PATTERSON: Okay.

Page 8492

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1-800-632-2720

CROSS-EXAMINATION

1

2 BY MR. EGGAN:

3 Q Mr. Donohue, the --

4 A Is that Mr. Eggan?

5 Q Yes, it is.

6 A I'm having a little difficulty hearing you. I don't know if
7 you can get closer to a mike.

8 Q I can.

9 A Okay.

10 Q I'll switch places with Mr. Wallace. Mr. Donohue, just a
11 few questions for you. You indicated that in October the
12 project ended when the new owner of the Nicolet Minerals
13 Company essentially caused the project to be withdrawn; is
14 that right?

15 A Well, it was purchased from the owners.

16 Q Okay. But there was a letter dated October 28th of 2003,
17 wasn't there, from Glen Reynolds, the project manager of
18 Nicolet Minerals Company, in which the permit application
19 was withdrawn?

20 A That is correct. And Mr. Reynolds at that time -- by that
21 time, the -- the project had already been sold to the Native
22 American tribes. And Mr. Reynolds was one of the attorneys
23 representing one of the Native American tribes.

24 Q Understood. But the bottom line was that it was withdrawn
25 by the Native American tribe, wasn't it?

Page 8493

NetworkReporting

1-800-632-2720

1 A That's correct.

2 Q Okay. And that tribe was also critical of some of the
3 engineering features, weren't they, at that mine?

4 A They were.

5 Q Okay. And the letter dated October 28th of 2003 specifies
6 what those -- what those concerns were, doesn't it?

7 A I don't have that letter in front of me.

8 Q Okay. You've seen it?

9 A About -- in October 2003, yes.

10 Q Okay. Well, one of the things in that letter was a -- was a
11 criticism stating that some of the engineering features
12 proposed in the application had never been tried in a
13 project of this size in an area enveloped by such vast
14 quantities of pristine and irreplaceable water resources.
15 That was one of the lines in the letter from Mr. Reynolds to
16 the state of Wisconsin, wasn't it?

17 A That was Mr. Reynolds' letter, yes.

18 Q Okay. And in the letter, he also said that:

19 "Since most of the proposed pollution prevention
20 technology for this project has eventually failed over
21 the long term, it is highly unlikely that the citizens
22 of this state" -- meaning Wisconsin -- "would
23 eventually be faced with the burdens of cleanup costs
24 in perpetuity if this project was built as designed."

25 That's what they said in that letter, didn't they?

Page 8494

NetworkReporting

1-800-632-2720

1 A That's what Mr. Reynolds, one of the attorneys for the
2 Native American tribes, said, yes.

3 Q That's what Mr. Reynolds said, isn't it?

4 A Yes, one of the representatives of the Native American
5 tribes.

6 Q And the letter -- and the letter came from the Nicolet
7 Minerals Company, didn't it?

8 A And that was at that time owned by the Native American
9 tribe.

10 A Sir -- sir -- Mr. Donohue, let's go ahead and answer my
11 question. It came from the Nicolet Minerals Company. It
12 doesn't matter to me if it was a Native American tribe or
13 not. It came from the company, didn't it?

14 A At that time owned by the Native American tribe, correct.

15 Q Okay. Now, we've already indicated that Crandon was never
16 permitted. But as a part of the Crandon project -- and this
17 is when Foth & VanDyke was involved -- the Nicolet Minerals
18 Company complete a detailed assessment of potential
19 groundwater inflow to the proposed mine project, didn't
20 they?

21 A We did that as part of the permitting process, yes.

22 Q Okay. Crandon was a zinc and copper mine, wasn't it?

23 A That is correct.

24 Q All right. And it was going to be essentially a sulfide
25 mine as Kennecott is a sulfide mine also?

1 A It had sulfide mineralization in the rock, correct.

2 Q Okay. All right. And based on calculations that Foth &
3 VanDyke did, Nicolet estimated inflows at that mine, didn't
4 they?

5 A Yes; that is correct.

6 Q And the estimated inflows that you came up with -- that Foth
7 came up with was 450 gallons per minute. And that was based
8 on your best engineering practices; right?

9 A That's correct.

10 Q Okay. And you actually came up with a predictable -- or
11 excuse me -- practical worst case scenario of 750 gallons
12 per minute; is that right?

13 A That's correct.

14 Q Okay. And you testified to that. And you believed at that
15 time in documents submitted to the Wisconsin Department of
16 Natural Resources -- you believed those estimates were
17 conservative, didn't you?

18 A We believed that they appropriately bracketed the range of
19 potential conditions that we would have to consider.

20 Q Well, do you believe that the -- that the 750 gallon per
21 minute mine flow -- and this is your worst case scenario --
22 that that 750 gallon per minute prediction was very
23 conservative?

24 A We believed it was conservative.

25 Q Would you believe it was -- would you agree with me that it

1 was very conservative?

2 A Well, you're ascribing adjectives. I'd say it was
3 conservative.

4 Q Okay. Do you have the March 13, 2001, document in front of
5 you? It seemed to me you might have been referring to that
6 before.

7 A March 13, 2001?

8 Q 2000.

9 A Yes.

10 Q Okay. And do you see -- I'm looking at the first section of
11 that report entitled "Introduction and objective."

12 A Yes.

13 Q Okay. And look at the first full paragraph -- excuse me --
14 the first sentence of the second full paragraph. Okay?

15 A Yes.

16 Q Doesn't that say, "The PWC mine inflow prediction represents
17 a very conservative assessment of potential mine inflow"?

18 A It says it represents a conservative -- I see
19 "conservative." I don't -- okay. "Very conservative," I
20 see that.

21 Q "Very conservative." Okay.

22 A Yeah.

23 Q I was just looking for the word "very." And you agree that
24 it's there.

25 A Okay.

Page 8497

NetworkReporting

1-800-632-2720

1 Q Okay. And so -- so at least based on this document, which
2 bears your signature, --

3 A Uh-huh (affirmative).

4 Q -- it was that 750 gallon estimate was very conservative?

5 A Yes.

6 Q Okay. And here it has been -- there has been testimony in
7 this case that your estimates of inflow were very
8 conservative; am I right?

9 A Yes.

10 Q Okay. Now, it's also my understanding -- and you testified
11 to this earlier, but correct me if I'm wrong -- that 650
12 gallons per minute was selected by Foth & VanDyke as the
13 design basis for the wastewater treatment plant there?

14 A 600 gallons per minute was.

15 Q Did I say 650?

16 A Yes.

17 Q I apologize. 600. Okay. Now, you've also indicated that
18 the Wisconsin DNR did a review. And they did do a review of
19 the regional groundwater flow model, didn't they?

20 A That is correct.

21 Q And the DNR in Wisconsin concluded that a worst case
22 scenario of 1200 gallons per minute was appropriate, didn't
23 they?

24 A They concluded that it could be up to 1200 gallons per
25 minute, and we disagreed with that.

Page 8498

NetworkReporting

1-800-632-2720

1 Q Obviously you disagreed with it?

2 A Yes.

3 Q But they concluded that it could be as high as 1200 gallons
4 per minute?

5 A That is correct.

6 Q So the Wisconsin DNR in the Crandon Mine situation looked at
7 your predictions and they believed that their worst case
8 scenario compared to your worst case scenario was a
9 difference of something like 450 gallons per minute, wasn't
10 it?

11 A That is correct.

12 MR. EGGAN: I have nothing further, your Honor.

13 MR. LEWIS: Nothing further.

14 MR. WALLACE: I have nothing, your Honor.

15 MS. HALLEY: Nothing.

16 MR. LEWIS: You're all done, Mr. Donohue.

17 JUDGE PATTERSON: Thank you, Mr. Donohue.

18 MR. EGGAN: Thank you, Mr. Donohue.

19 THE WITNESS: Thank you.

20 (Off the record)

21 MR. PREDKO: For the record, Kennecott calls
22 Tracey Jane Arlaud.

23 JUDGE PATTERSON: Ms. Arlaud, can you hear
24 everybody?

25 MS. ARLAUD: Sorry?

Page 8499

NetworkReporting

1-800-632-2720

1 JUDGE PATTERSON: Can you hear everybody?

2 MS. ARLAUD: Just.

3 JUDGE PATTERSON: Just.

4 MR. PREDKO: Can you hear me, Tracey?

5 MS. ARLAUD: I can hear you.

6 JUDGE PATTERSON: Can you hear me better now?

7 MS. ARLAUD: No. That's actually softer.

8 JUDGE PATTERSON: Oh. I'm not going to talk much.

9 If you can hear Mr. Predko, we're okay for now.

10 MS. ARLAUD: Okay.

11 JUDGE PATTERSON: Before he starts, I want to have

12 you sworn since it's been awhile since you testified before.

13 REPORTER: Do you solemnly swear or affirm the

14 testimony you're about to give will be the whole truth?

15 MS. ARLAUD: Yes.

16 TRACEY JANE ARLAUD

17 having been called as a surrebuttal witness

18 by the Intervenor and sworn:

19 DIRECT EXAMINATION

20 BY MR. PREDKO:

21 Q Now, Ms. Arlaud, you testified in this matter previously a
22 few months ago; correct?

23 A Yes.

24 Q And just to remind the court, your expertise lies in the
25 areas of mining engineering, explosives and blasting in

Page 8500

NetworkReporting

1-800-632-2720

1 mines; is that correct?

2 A Yes.

3 MR. PREDKO: And for the record, your Honor, her
4 CV was admitted as Intervenor 75 in this case.

5 Q Now, Ms. Arlaud, since you testified the last time in this
6 case, Petitioner's witness Jack Parker has testified again
7 and has given some testimony related to a draft Alaska
8 standard for blasting for protection of fish. Are you
9 familiar with that standard?

10 A Yes.

11 Q Now, Mr. Parker in his recent testimony has stated that that
12 standard applies to underground blasting. Do you agree with
13 that statement?

14 A No.

15 Q And can you tell us why you don't agree?

16 A I don't agree --

17 MS. HALLEY: Your Honor, I object. He's asking
18 her for a legal conclusion about the statute. And
19 furthermore relevance. It's a statute that's not even
20 applicable in Michigan.

21 MR. PREDKO: Are you going to stipulate that that
22 standard does not apply at all to this case?

23 MS. HALLEY: Clearly an Alaskan statute does not
24 apply in Michigan. I don't think we need a stipulation to
25 clarify that.

Page 8501

NetworkReporting

1-800-632-2720

1 MR. PREDKO: Well, it was Petitioners who brought
2 this standard by way of Mr. Parker's testimony into
3 evidence. And Mr. Parker has testified that he believes
4 that it's relevant to the issues in this case. If
5 Petitioners will now stipulate that it is not relevant to
6 the issues, we will forego Ms. Arlaud's testimony on this
7 point.

8 MS. HALLEY: I think her legal conclusion is
9 irrelevant, not the factual circumstances that the statute
10 strives to address.

11 MR. PREDKO: Well, first of all, your Honor, there
12 is no legal conclusion. She's testifying whether this
13 particular draft Alaska standard applies to underground
14 blasting versus some other type of blasting. And she's a
15 blasting expert, and she's familiar with the standard. And
16 she's fully qualified to tell the court whether it applies
17 to a certain type of blasting. It's not a legal conclusion.

18 JUDGE PATTERSON: I agree, Counsel. I don't see
19 it as a legal conclusion. I'll overrule.

20 Q Now, Ms. Arlaud, can you tell us why you believe that this
21 draft standard does not apply to underground blasting?

22 A Okay. The draft standard actually says itself that it's for
23 high explosives in conjunction with seismic exploration,
24 rock quarrying, which is surface mining, and road
25 construction instances. So this standard was developed

Page 8502

NetworkReporting

1-800-632-2720

1 for -- in seismic, when they actually set off explosives in
2 the water, to be able to reflect waves off the bottom of
3 sediments, what have you, to be able to see what is at the
4 bottom. It also would apply when you're blasting in, say, a
5 harbor, blasting a pylon in the -- maybe a pier or something
6 like that. It also is for blasting subsurface near water
7 bodies such as road cuttings and quarrying near to water
8 bodies. It is not and does not state anything about the
9 blasting from underground mines and does not take into
10 effect the difference in attenuation between underground P
11 waves. This is subsurface S waves which behave differently
12 from a geophysical point of view.

13 Q Now, Ms. Arlaud, even if you assume that that draft standard
14 did apply to underground blasting, have you calculated the
15 expected pressure wave from underground blasting at the
16 proposed Eagle Mine?

17 A Yes.

18 Q And can you tell us generally how you calculated the
19 expected pressure wave and the result of your calculation?

20 A Okay. We -- we, being myself, Kennecott, calculated using
21 the mathematical relationships described in the geophysical
22 tests for transference of pressure wave -- overpressure
23 waves in rock into saturated alluvial into water. We
24 used -- I used gabbro with a density of 3 and a sonic
25 velocity of 6,996 milliseconds then saturated alluvial with

1 a density of 2.1 with a sonic velocity of 1700 meters per
2 second and water with a density of 1 through 1463 sonic
3 velocity. What we did is using the relationships described
4 in the text, we calculated the peak particle velocity,
5 the -- based on the distance from the blast to the bottom of
6 the creek, which is 110 meters, the maximum kilograms of
7 charge per delay, which is 230.5 kilograms or 508 pounds,
8 and integrated those into the three equations and came up
9 with a pressure wave at the interface of the sediment and
10 the water in the creek, which was 1.5 psi.

11 Q Now, that 1.5 psi calculation is a theoretical calculation
12 based on the equations in the standard. Are there any other
13 adjustments that you have to make to that theoretical
14 calculation to make it more of a real world number?

15 A Yes.

16 Q The theoretical calculations do not take into account
17 reflection of the P wave. As I testified earlier, the P
18 wave penetrates through the rock in a straight direction.
19 And when it comes to a interface between different rock
20 types, a majority -- a large percentage of the energy is
21 reflected back into the rock. And therefore the P wave that
22 has been transmitted into the next media is of a lot lower
23 value. It doesn't take into account this. The literature
24 where they have actually measured peak particle velocities
25 and then used this calculation and then compared the

1 calculated value for water overpressure versus observed
2 recorded water pressures from the same blast using a
3 hydrophone in the water suggests that the theoretical
4 calculations overestimate the pressure wave in the water by
5 10 to 80 times. So what that means for us is that, although
6 we have a calculated pressure wave of 1.5, in reality, we
7 would have, using a hydrophone in the field, a pressure wave
8 of about .15 psi.

9 Q Now, whether you use the 1.5 calculated number or the more
10 real world .15 number, how do those numbers compare to the
11 limit set forth in the draft Alaska standard?

12 A The draft Alaska standard is 2.7 psi with a calculated
13 theoretical of 1.5. We are way under the standard. And if
14 you use what's likely to be in the real world, we're
15 approximately 18 times under the standard.

16 Q Now, Ms. Arlaud, there has also been testimony as to noise
17 emitted by the proposed mining operation. Can you tell us
18 about the levels of noise that will be emitted from blasting
19 at the proposed Eagle Mine?

20 A Yes. We -- we, meaning myself, calculated the expected air
21 pressure wave from the initial development into the eastern
22 outcrop. And there's a mathematical linear relationship to
23 convert that into decibels, which is the typical measurement
24 for sound. Using the maximum charge per delay, we
25 calculated that, at ground level directly above the

Page 8505

NetworkReporting

1-800-632-2720

1 portal -- first portal blast, we would have 98 decibels at
2 that site.

3 Q And so when you're talking about this first portal blast,
4 you're talking about the initial blasting into the outcrop
5 before you get to underground blasting?

6 A Yes. As I have already testified, we excavate a box cut
7 down to the face so we've below -- at least 2.8 meters below
8 the current soil level in like a trough, if you like. And
9 then we blast the face. In that blast, we -- first blast,
10 which the noise comes from the air displacement in the
11 blast, we calculate that we would have 98 decibels.

12 Q And can you tell us how loud 98 decibels is?

13 A Okay. A comparison of 98 decibels is it's between the sound
14 of somebody shouting and a blaring radio. Alternatively
15 it's 2 decibels below the sound of a chainsaw or a circular
16 saw or pigs feeding in a pig house.

17 Q Okay. And that's the level of sound right at the site of
18 the blast; correct?

19 A Yes.

20 Q Now, can you tell us what the level of sound will be from
21 that same initial blasting at the fence line?

22 A Yes. At the closest fence line, which is approximately 55
23 meters away, the blast would be 67 decibels, which is below
24 the level of conversational speech like we're having now.

25 Q And the blasts, the 98 decibels at the portal and 67 at the
Page 8506

NetworkReporting

1-800-632-2720

1 fence line, how often will these blasts occur?

2 A In the initial development, these blasts would occur
3 approximately -- we'd have approximately 1.5 blasts each day
4 or three blasts in a 48-hour cycle.

5 Q And how long do these blasts last?

6 A Okay. These blasts last 8,000 milliseconds or 8 seconds.

7 Q And so we're talking about seconds of noise each day?

8 A Yes.

9 Q Now, you've told us about the initial blasting into the
10 portal rock. Can you tell us how the level of sound from
11 the blasting will dissipate as you move underground?

12 A Yes. Sound drops off exponentially, which means, with
13 increased distance, there's a steep drop-off in sound level.
14 So once we're 37.2 meters into the portal when we blast into
15 the outcrop, at the portal the sound would drop from 98
16 decibels to approximately 72 decibels which is at the level
17 of conversational speech. So as you can see, that drops off
18 rapidly.

19 Q And how long will it take to get to that approximately 38
20 meter depth?

21 A Assuming the one-and-a-half blasts per day, six to seven
22 days.

23 Q And so you will have six or seven days of seconds of
24 blasting each day at the level of a blaring radio, and that
25 will dissipate to the sound of conversational speech right

Page 8507

NetworkReporting

1-800-632-2720

1 at the portal?

2 A Right at the portal, that is correct. And at the fence
3 line, it will drop from conversational speech down to the
4 sound of a clock radio to conversational speech -- I'm
5 sorry -- electric clock, not clock radio.

6 MR. WALLACE: Your Honor, before we go on, I'm
7 sorry. I need to interpose an objection. The witness is
8 testifying entirely now and has been for some period of time
9 as to some set of, as I have to characterize it, pretty
10 complex calculations that she's apparently done. And we've
11 had witnesses throughout this trial conduct various
12 calculations, but we've always been able to see them and
13 look at their sources and, in the end, cross-examine them.
14 As I sit there, I realize that by doing this as a phone
15 deposition and not being provided with these calculations,
16 that there's clearly no effective way to cross-examine. And
17 I must move to strike this. This is -- this is
18 unanticipated. If she had calculations she wanted to make
19 part of her testimony, we could have been handed these
20 calculations. We could have been prepared to cross-examine.
21 But this -- this is just a bunch of numbers. And I don't
22 think this should be in the record. We've never had this
23 happen before where we didn't have a fair shot or some shot
24 on either side at what the witnesses were claiming were the
25 basis of their numbers. And here we have no shot.

Page 8508

NetworkReporting

1-800-632-2720

1 MR. PREDKO: Well, first of all, your Honor, if
2 there was some objection to doing this by telephone, they
3 should have made that earlier when we all agreed to do this
4 by telephone. We were fully willing to bring both of these
5 witnesses back in person if need be. They had the
6 opportunity to object. And --

7 MR. WALLACE: That's not the point, Counsel. You
8 know that. The point is we don't have the numbers. It's
9 not that she's on the phone; we don't have the numbers.

10 MR. PREDKO: You do have the numbers. She's a
11 blasting expert. And I don't think that the noise numbers
12 that she's talking about now result from any complicated
13 calculations. The other numbers that she's already
14 testified to with respect to this draft Alaska standard,
15 which counsel has said may not be relevant here, Mr. Parker
16 did the same type of calculation and did it without any
17 complex calculation up on the board.

18 MR. WALLACE: But he was here to be able to do
19 that.

20 MR. PREDKO: The fact he did it in his head --

21 MR. WALLACE: This is simple. I would ask the
22 accommodation of your placing these calculations on the
23 board for us so we can examine them.

24 MR. PREDKO: She's subject to cross-examination
25 over the phone, your Honor. If we want to today, I'm sure

1 that Ms. Arlaud could fax to the court any calculation that
2 she has in writing, and then counsel could review it and
3 cross-examine her based upon that handwritten calculation.

4 MR. WALLACE: Well, I'd like to reserve the right
5 to do that then. I'm sorry to prolong this. But I'm
6 sitting here with my hands tied. And if you have the
7 numbers, Counsel, why not give them to us? If you don't,
8 then I don't understand your representation that they're
9 simple. They didn't sound simple.

10 MR. PREDKO: The numbers that she's testified
11 about about sound levels, I believe they are fairly simple.
12 But you can cross-examine her.

13 MR. WALLACE: Well, I don't think this should be
14 admitted, because I can't cross-examine her.

15 MR. PREDKO: Your Honor, I think that, number one,
16 we're rebutting exactly what they said in their rebuttal
17 case. It's proper surrebuttal. They have the opportunity
18 to cross-examine here by telephone. And he can certainly
19 find out through cross-examination whether these are
20 complicated calculations. And if he actually wants to see
21 the calculation, we could have Ms. Arlaud fax something to
22 the court here today so that we can still wrap up this
23 hearing today.

24 JUDGE PATTERSON: Okay. I'll overrule the
25 objection at this point.

Page 8510

NetworkReporting

1-800-632-2720

1 Q Now, Ms. Arlaud, once the blasting is all the way
2 underground and blasting is taking place in and around the
3 orebody, what level of noise is audible above ground?

4 A The noise -- the blasting noise would not be audible above
5 ground on the surface.

6 Q And not audible at all?

7 A Not audible at all because the noise comes from the
8 displacement of the air. Given the openings and the
9 distance to the surface, we would not hear the air blast
10 from the production blasting at all. I have personal
11 experience of being less than 10 meters above and a much
12 larger stope blast, and it could not be heard from the
13 surface.

14 Q Now, Ms. Arlaud, do you have general experience with this
15 type of blasting, both the development blasting and
16 production blasting?

17 A Yes, I do.

18 Q And do the levels of noise that you talked about with
19 respect to decibels and a blaring radio and conversational
20 speech -- are those consistent with what you have actually
21 seen in the field?

22 A Yes, they are.

23 MR. PREDKO: Thank you, Ms. Arlaud.

24 MR. WALLACE: Anybody else any questions? I mean,
25 I -- if she could take a minute and fax her calculations,
Page 8511

NetworkReporting

1-800-632-2720

1 then I'll start questioning while these are coming over the
2 wires.

3 JUDGE PATTERSON: Okay.

4 MR. WALLACE: Is there a fax number she can --

5 JUDGE PATTERSON: There is, but I don't know what
6 it is. I'll have to get that.

7 MR. PREDKO: Tracey, we'll go off the record. And
8 then I will call you with the fax number. Okay?

9 THE WITNESS: Right. Okay.

10 MR. PREDKO: Okay. Thank you.

11 THE WITNESS: Thanks.

12 (Off the record)

13 JUDGE PATTERSON: Are you ready?

14 MR. WALLACE: I can get right into this.

15 CROSS-EXAMINATION

16 BY MR. WALLACE:

17 Q Ms. Arlaud, my name is Bruce Wallace. We met many moons
18 ago.

19 A Yes.

20 Q And I have a few more questions in response to your
21 testimony today.

22 A Sure.

23 Q First of all, just to understand this, we've been handed a
24 six-page fax -- facsimile, the first three pages of which
25 are handwritten and then three pages of what looks like some

1 kind of publication.

2 A No; no. It's notes I typed up.

3 Q All right. And let me just ask you this. And I'm not
4 purporting to understand these calculations, but I
5 appreciate you sending them to us.

6 A Yeah, sure.

7 Q Where in these pages is the calculation that predicts a
8 decibel level of 98 at the site?

9 A Okay. If you go to the handwritten pages --

10 Q Yeah.

11 A Okay. So if you go to the first page, it says "Air blast
12 overpressure for the portal surface." Right? So the basic
13 equation we use is the overpressure, which is -- the
14 equation for that is 3.3 times Q, Q which is the kilograms
15 of charge detonated on a single detonator, to the power of
16 1/2 divided by the distance from where you want to measure
17 the explosives' sound, which is R, which in this case is 2.8
18 meters because we're -- the last detonation is 2.8 meters
19 below the flow level. So basically in this equation, the
20 first equation, if you go to page 2, is, given that we use
21 much smaller holes in development than in production
22 blasting, we use 4 -- a maximum of 4 kilograms of explosives
23 to a detonator. So we put 4 kilograms -- if you're looking
24 at page 2 -- divided by 2.8 to the power of 1/2 -- sorry --
25 4 to the power of 1/2, and then 2.8 for the whole equation

Page 8513

NetworkReporting

1-800-632-2720

1 to a power of 1.2, so that calculates that we get a
2 pressure -- air pressure wave of 1.67. The second equation
3 on page 2, which is -- which converts the pressure wave into
4 decibels. And the first part of the equation, L_p , which is
5 the gas we want, $20 \log_{10}$ is a mathematical function, over
6 the pressure wave that we just calculated, which is 1.67,
7 divided by a set -- a reference pressure, which is a set of
8 10 to 10 to the minus 6 pascals. And if you put that into
9 the calculations you'll see on the second page -- it says --
10 it's three little dots, and it says " L_p equals 89.43 (sic)
11 decibels."

12 Q 98- --

13 A -- .43 decibels. Okay?

14 Q All right. This 2.8 meters, --

15 A Yes?

16 Q -- that represents depth?

17 A Yeah. That is from a swell level, you know, of -- because
18 remember in my earlier testimony how we've got to create
19 that, like, trough into where the rock is, the eastern
20 outcroppings, and we're going to be 2.8 meters below the
21 actual soil level. So if someone was standing right above
22 where we're going to blast on the original soil level, we
23 would get 98.43 decibels right there.

24 Q Okay. And that doesn't assume that there's any substance
25 over the explosives; right?

Page 8514

NetworkReporting

1-800-632-2720

1 A No.

2 Q Okay. And does this tell us anything about the blast
3 pattern that you'll be using?

4 A No. Sound and vibration is purely based on the kilograms of
5 charge of -- on a single detonation -- detonator that goes
6 off.

7 Q I'm recalling from your testimony of the first time you
8 testified that one of the ways you would control the effects
9 of the explosives was the concentration of the explosives;
10 correct?

11 A Yeah.

12 Q Okay. And another way would be how much explosives you used
13 each time; right?

14 A Yeah.

15 Q Another way would be blast pattern; right?

16 A Yes.

17 Q Okay. And another way would be the timing of the delays in
18 the explosion of each one of the charges?

19 A Yes. So this equation is -- doesn't take any dampening
20 effect. It is purely based on how many kilograms on each
21 detonator we blast, which is what creates the noise.

22 Q I'm just wondering why this equation doesn't take into
23 account any of the things that you were telling us were
24 protections against damage and noise when you testified the
25 first time?

Page 8515

NetworkReporting

1-800-632-2720

1 A Well, the noise relationship is -- damages is one different
2 issue. Damage, you know -- limiting damage to backfill is
3 not what we're talking here. Here we're just purely talking
4 about noise. And so I've given you the worst-case scenario.

5 Q So the nature of the blast pattern; in other words, where
6 the holes were and how they're distributed in the medium
7 being broken apart; that -- you can't control noise by the
8 way you do a blast pattern?

9 A No. For the blast pattern it's purely based on the
10 kilograms of charge on an single detonator. We can do --
11 now, we can do other things, like we can put in a blast
12 blanket in the noise. And it doesn't also take into account
13 that we're actually sub below ground, so most of the noise
14 would be going straight ahead through that trough and not
15 going up. So, you know, this is the worst-case scenario.
16 In actual fact it would probably be slightly lower sounding
17 than this.

18 Q Okay. I just want to be clear, because you told us these
19 factors when you first testified.

20 A But when I testified, I was talking -- I wasn't talking
21 about noise. I was talking about the blasting effects
22 against backfill; not noise.

23 Q Okay. So none of those devices help make this mining
24 operation less noisy?

25 A Not -- no, not the initiation pattern. The only thing that

Page 8516

NetworkReporting

1-800-632-2720

1 will make it less noisy, as I've said, is the kilograms of
2 charge per detonator; putting up blast blankets; possibly
3 putting up some misters; and reducing the length of the
4 holes and therefore the amount of explosives on each hole,
5 detonator.

6 Q And you're testifying that based on this formula, you
7 predict that at the fence line the sound of blowing up Eagle
8 Rock is going to be about the sound of a normal
9 conversation; is that right?

10 MR. PREDKO: Objection. Mischaracterizes her
11 testimony.

12 A I'm testifying that 55 meters away, which is the closest
13 position to the fence line, the noise expected based on
14 these formulas would be approximately 67 from the first
15 initial blast. The very first blast, the maximum noise at
16 the fence line would be 67 decibels from the first blast of
17 the eastern outcrop.

18 Q Okay. So is what I said correct, that you're saying that
19 from the very blast into Eagle Rock, if you walk over to the
20 fence line 55 meters away, the sound generated there will be
21 about the sound of a normal human conversation?

22 A What I'm saying is at 55 meters away the blast from the
23 eastern outcrop at the fence line would be, yes, at the
24 level of a conversation.

25 Q Okay. And --

Page 8517

NetworkReporting

1-800-632-2720

1 A Which would be below, you know --

2 Q And have you made any effort to simulate this and measure it
3 with sound equipment? I mean, this is a formula. But have
4 you done that?

5 A Well, this is a published formula. I -- well, we're not
6 allowed -- we haven't been allowed to blast into the
7 eastern outcrop, so I can't measure it to confirm it. But
8 this is a published formula in blasting text.

9 Q Well, I'm not talking about going and experimenting with
10 Eagle Rock, because it's not resolved that you're able to do
11 that.

12 A I mean, I have personal experience of sitting 5 meters away
13 from a development blast of similar kind and, you know, just
14 around the corner from it and not being, you know -- it
15 being sort of in this range, you know, in close proximity to
16 it, to what we said it would be at the portal. I mean, I've
17 seen portal blasts; I've heard portal blasts, and, you know,
18 they are in the range that this calculates --

19 Q Yeah. Well, I --

20 A -- from my -- you know, from my own hearing. I mean, I
21 haven't used sound equipment myself. But these are
22 obviously based on, you know, sound, you know, published
23 data, these equations. I didn't make the equation up.

24 Q I understand you didn't make the equation up. And I guess
25 I'm just asking you with actual sound equipment, because I

Page 8518

NetworkReporting

1-800-632-2720

1 think we've all watched movies of rock being exploded; we've
2 seen films of it; the impression you get is something very
3 loud. And this formula comes up with a different notion.
4 And I'm wondering if with a blast pattern like the one
5 you're going to use at Eagle Mine, with the amount of
6 emulsion explosives you're going to use at Eagle Mine, with
7 the dilution you told us you were going to use at Eagle
8 Mine, with the delays you told us you're going to use at
9 Eagle Mine, if anybody has taken sound equipment out and
10 confirmed that the sound 150 feet away would be the sound of
11 a human voice with equipment?

12 A Personally I haven't measure sound at an explosive site.
13 All I have is personal experience. I would suggest that we
14 don't base, you know, things like this on what Hollywood
15 comes up with, because they obviously magnify the sound of
16 things for a special effect and value. But these formulas
17 are obviously based on, you know, recorded sound. And then,
18 you know, the decibels -- the decibel relationship that you
19 see here is based on published literature, on hearing
20 protection. And even the safe -- health and safety
21 executives has, you know, ratings of decibels and what it
22 equates to. The health and safety executive published one
23 stating that 100 decibels is at the level of a train source.
24 So, you know, these are published sound values that people
25 use in the mining industry, agriculture industry and

Page 8519

NetworkReporting

1-800-632-2720

1 elsewhere to protect their employees against hearing damage,
2 you know. I can't argue any more validities about it, you
3 know. These are published numbers.

4 Q Are miners around this kind of explosive activity at risk
5 for hearing damage? They are, aren't they?

6 A But miners when we blast, we have, you know -- one, we don't
7 stand right next to a blast, for a start.

8 Q And you also wear equipment over your ears; right?

9 A We do, yes, like people who use a chainsaw wear hearing
10 protection around their ears or should do, you know.

11 Q And is it your testimony that the sound of a chainsaw 150
12 feet away is also less than human conversation?

13 A Well, I mean, it would be -- it would be -- you know, I
14 would have -- I don't know what a calculation for a
15 chainsaw, you know, is. You know, I don't have those. This
16 equation doesn't take into effect how the acoustics of a
17 chainsaw work, so I can't testify to that.

18 Q Are there any permit conditions that you're aware of in the
19 permit that's at issue here that required measuring sound?

20 A I'm -- I can't remember what exactly is in the permit with
21 regard to sound.

22 Q Do you know if there are any permit conditions that specify
23 that you be limited to a certain kind of blast pattern that
24 you have in mind here?

25 A No.

Page 8520

NetworkReporting

1-800-632-2720

1 Q Do you know if there are any permit conditions that would
2 limit you to the timing -- the delay timing between
3 explosives in the drill pattern to correspond to what you
4 have in mind here?

5 A No.

6 Q Okay. Do you know if there are any permit conditions that
7 would limit you in the concentration of emulsion that you
8 use which initially determines the sound?

9 A No.

10 Q All right. Let's talk about physical damage for a minute.
11 Your calculations -- are the physical damage calculations
12 set forth in the typed up materials?

13 A The physical -- I'm not understanding what you mean by
14 "physical damage." Are we talking about the pressure wave
15 generated through production blasting at the bottom of the
16 creek?

17 Q Well, you testified about that; right?

18 A Yes. Is that what we're talking about here? Because
19 "damage" has a different implication.

20 Q Well, I was asking a little broader question, but let's
21 start with that. Is that what these typewritten pages deal
22 with?

23 A Yeah.

24 Q Okay. And these are calculations ultimately to derive a
25 value for overpressure at the bottom of a body of water;

1 correct?

2 A That is correct, yes.

3 Q And overpressure is one of the ways that damage could occur
4 to, for example, fish eggs; right?

5 A My understanding is that there is some relationship at some
6 level; that overpressuring in water bodies can damage fish.

7 Q Okay. And so you did some calculations to determine based
8 on assumptions whether the overpressure that you're
9 predicting here would be enough to damage fish; correct?

10 A Yes.

11 Q All right. Now, overpressure is just one of two ways that
12 blasting causes potential damage to fish, fish eggs or any
13 other physical object in the area of blasting; correct?

14 A I don't know that. I'm not a fish expert.

15 Q Well, now this isn't a fish question; this is a blasting
16 question. Overpressure causes damage, and vibration causes
17 damage; correct?

18 A My understanding is that it's an instantaneous overpressure
19 in the water that may do damage to the fish. How you get
20 that overpressure can come from blasting. But I don't know
21 that -- you know, I can't testify any more than that.

22 Q Well, I won't ask you to testify about fish. I'll just ask
23 you to testify about blasting damage.

24 A Okay.

25 Q Blasting damage can result from overpressure; right?

Page 8522

NetworkReporting

— 1-800-632-2720 —

1 A My understanding from the literature is that instantaneous
2 overpressures over a certain amount has done damage to fish.

3 Q Okay. Are you aware that vibration from blasting can also
4 cause damage?

5 A No. My understanding is that vibration from blasting may
6 generate enough overpressure in the water to do damage to
7 the fish.

8 Q How about vibration in and of itself causing damage on the
9 surface? It causes damage to structures; it causes damage
10 to objects -- correct? -- vibration itself?

11 A Yes, depending on what the pressure wave is; I believe so.

12 MR. PREDKO: I just want to place an objection to
13 the discussion about vibration causing damage to fish.
14 There's been absolutely no testimony in this record about
15 vibrations causing damage to fish.

16 MR. WALLACE: Well, let's just talk about
17 vibration itself causing damage, then.

18 Q And I just want to be clear here. You have not done any
19 calculations to show that the vibration resulting from the
20 blasting at Eagle Mine will or will not cause damage, have
21 you?

22 A No. If you look at the page you'll see that the peak
23 particle velocities as stated there for the assumed
24 densities, on the third line -- on the second last line.
25 And you'll notice that those are below the limits of damage

1 that you stated before in your court case.

2 Q Okay. But that's --

3 A So in that way we have calculated the peak particle
4 velocities, and we are below any damage limits for
5 buildings.

6 Q You've used peak particle velocity as a value in calculating
7 overpressure; correct?

8 A Yes, because that's part of the equations.

9 Q But as you know, peak particle velocity is a value that also
10 is looked at standing alone to determine possible damage;
11 correct?

12 A Yes. And we're below those limits that you've stated
13 previously the last time we had these discussions.

14 Q Well, have you calculated peak particle velocity here?

15 A Yes.

16 Q And what are the values that you've come up with for that?

17 A Okay. The peak particle velocity at the bottom of the
18 stream, in the worst-case scenario, in inches per second, is
19 0.23 inches per second, or .58 millimeters per second
20 ranging down to .008 -- .08 inches per second, or .2
21 centimeters per second. So in both cases we are below any
22 statutory limit for either buildings or the Alaskan draft
23 standard.

24 Q And what frequency are you assuming?

25 A What frequency am I assuming?

Page 8524

NetworkReporting

1-800-632-2720

1 Q Yes.

2 A I don't understand what you mean by "frequency."

3 Q What frequency of vibration are you assuming will result
4 from the blasting at Eagle Mine?

5 A I'm assuming those measurements I just gave you, --

6 Q But I meant --

7 A -- based on 110 meters from the creek and 230.5 kilograms of
8 explosives per detonator.

9 Q But I'm not seeing in your formula frequency, Ms. Arlaud.

10 A Well, frequency isn't in the formula.

11 Q And you're aware of the fact that the government standards
12 we're talking about vary depending on frequency; correct?

13 A The government standards are issued in inches per second or
14 millimeters per second, which is --

15 Q Right, depending on what the frequency is; correct?

16 A No, I haven't seen it expressed in frequency. I've only
17 seen it expressed in those units.

18 Q Well, let me just see if I can refresh your recollection if
19 you look at these standards. For high frequency the
20 government standard is --

21 A What standard are we talking about here? There's no
22 buildings in the vicinity. I think we went through this
23 last time.

24 Q But I thought that's the standard that you're defending
25 here.

1 A I'm defending the draft -- I'm defending -- saying that
2 we're below the limits of the draft Alaskan standard. I'm
3 also saying that we're below the limits in inches per second
4 or centimeters per second or millimeters per second for
5 vibrations, you know. There are no buildings in the
6 vicinity of where we're blasting, you know. I'm here to
7 testify about the overpressures and instantaneous
8 overpressure potentially in the creek above the Eagle
9 project.

10 Q Well, you know, we don't have to head off in this direction.
11 But there are things like wastewater treatment plants there,
12 you know, extremely --

13 A And, you know, your --

14 Q Excuse me a minute -- extremely important to the environment
15 there.

16 A Yeah. And we are --

17 Q There are buildings in the area of this mine.

18 A We are, as I said -- and if you look at these numbers, peak
19 particle velocities, we are below those.

20 Q Okay. That's fine as a representation. But those numbers
21 depend -- do they not? -- on frequency?

22 A No. Those numbers depend on the kilograms of charge
23 detonated on a single detonator and the rock type and the
24 density of the rock.

25 Q The government standards for damage to buildings is up to 2

1 inches per second peak particle velocity for high frequency,
2 and .5 inches per second peak particle velocity for low
3 frequency; correct?

4 A Well, as you can see from these numbers we are way below
5 both those standards. We are .23 inches per second no
6 matter which frequency you look at. That is a calculated
7 inches per second. And we are below both of those
8 standards, so there is no issue here. And the distance --
9 and that is the distance to the creek. The mine is a lot
10 further -- the blasting is a lot further from -- this blast
11 detonation is a lot further than it is to the wastewater --
12 the wastewater treatment plant is a much greater distance,
13 and therefore, if we were to calculate that, we would expect
14 it to be even lower.

15 Q Okay. Well, I'm kind of following a moving target here.
16 Let me just pin you down on a couple things. Is frequency
17 considered in these calculations, and if so, where?

18 A No, frequency is not considered in these calculations,
19 because these are the calculations in which the
20 Alaskan-Canadian standards are, and they're not -- they do
21 not state about frequency; they talk about the peak particle
22 velocity, and that's therefore what I calculated.

23 Q And would you agree with me that the lower the frequency of
24 a vibration generated by blasting in connection with mining
25 operations, the greater damage it will cause?

1 A I haven't studied frequency, and I don't know what damage
2 you're referring to in terms of a mining operation, so I
3 cannot agree with you on those statements.

4 Q And again, are you familiar with any permit conditions
5 that -- for this proposed mine that would require measuring
6 seismographically peak particle velocity in connection with
7 your operations?

8 A No, I'm not aware of any permit standard that requires us to
9 measure peak particle velocity.

10 Q So you don't -- as far as you know, you're going to be able
11 to mine out there without recording sound and without
12 recording vibration, is that -- under the permit that's been
13 issued so far?

14 A I'm not intimately familiar with the permit, but I do not
15 believe that there is any permit condition that requires us
16 to do such things. However, having said that, I would
17 suggest that, you know, as a general practice in mining we
18 do measure our peak particle velocities in blasting, and I
19 have done that in several operations.

20 Q And would you intend to do it here?

21 A I would suggest that they will intend to do it here, yes.

22 Q Is there any place in writing in the entire application that
23 suggests that that's going to be part of this operation, to
24 seismographically --

25 A I have not read the application in detail.

Page 8528

NetworkReporting

— 1-800-632-2720 —

1 Q It's a good idea to protect against damage to
2 seismographically measure blast vibration, isn't it, Ms.
3 Arlaud? It's good practice?

4 A It's -- yeah, it's common practice to on occasion measure
5 peak particle velocities in blasting, damage to what, where
6 and what distance and what we're looking to protect, you
7 know, is at issue here.

8 MR. WALLACE: Thank you. That's all I have.

9 MR. EGGAN: I have no questions.

10 MR. BOCK: No questions.

11 MS. HALLEY: I have just maybe one or two.

12 JUDGE PATTERSON: Okay.

13 CROSS-EXAMINATION

14 BY MS. HALLEY:

15 Q Ms. Arlaud, this is Michelle Halley, representing the
16 National Wildlife Federation and the Yellow Dog Watershed
17 Preserve.

18 A Hi, Michelle.

19 Q We met when you were here.

20 A Yes.

21 Q I'm just wondering if the calculations you provided today,
22 where the assumptions came from, particularly the
23 assumptions about how much of the explosive would be in the
24 hole when it's detonated?

25 A Okay. That assumption comes from the length of the hole in

Page 8529

NetworkReporting

1-800-632-2720

1 the permit, which are --

2 Q But there was a range; right?

3 A I think most of the holes -- I took the longest hole, which
4 was 25.5 meters. And I -- so I was creating the worst
5 possible case here so that we could look at only the worst
6 case. So with a 25.5-meter hole using a 4-inch or 102-mill
7 hole, if we use -- I also used one of the higher end of the
8 density of -- again, for the worst-case scenario of
9 explosives. Using a density of 1.15 -- we can use lower. I
10 used -- I assumed that we used a 1-meter uncut charge
11 collar, which is typical when we're blasting vertical holes.
12 And if you take a 24-meter -- 34.4 meters, be 25.5-meter
13 hole charge, that with 1.15 SG explosives at a diameter of
14 102 millimeters, that gives you 9.4 kilograms per meter, and
15 for the 24.5 meters, that gives you 230.5 kilograms per
16 detonator delay.

17 Q So all of the assumptions that went into your calculations,
18 including the size of the hole, the amount of the
19 explosives, the length of the collar, the depth of the hole,
20 none of those are regulated by the permit; right?

21 A No, I do not believe so.

22 Q So this is a theoretical exercise you've done?

23 A No, this is what's --

24 Q Is what you do in the field --

25 A In order to break the rock, this is, you know, the highest

Page 8530

NetworkReporting

1-800-632-2720

1 amount of explosives that we would possibly ever use on a
2 single detonator.

3 Q But you're not limited to this amount by the permit; right?

4 A No. But we'd probably use less than this amount. I've gone
5 worst-case scenario here.

6 Q Okay. But that's not my question. You're not limited to
7 any of these amounts of explosives, size of the hole, depth
8 of the hole, anything by the permit; right?

9 A No.

10 Q Thank you. Ms. Arlaud, you talked a little about the Alaska
11 draft regulations. It sounds like you've done a little
12 reading of that. I wonder if you've read the blasting
13 standards from Florida? Have you?

14 A No, I haven't seen the Florida --

15 Q New York?

16 A I'm not aware that there are any.

17 Q Missouri?

18 A Again, if you'd like to present them in court, then we can
19 discuss all of those.

20 Q I'm just wondering if you've had a chance to review them?

21 A No, because I'm just here as a rebuttal witness. You guys
22 brought up the Alaskan standard. We're not debating New
23 York, Florida or anywhere else.

24 Q No, that's true. I'm just wondering if you've had a chance
25 to compare them with Alaska's or in any way to review them.

1 How about Illinois?

2 A I'm not aware of their blasting standards, because the mine
3 isn't in those states, and therefore I haven't looked at
4 those if there are actually any.

5 Q New Jersey?

6 A We can go through the whole country if you like, but the
7 answer's the same.

8 Q No, there's just two more that I'm aware of. California?

9 A No.

10 Q Washington?

11 A No.

12 MS. HALLEY: Okay. No further questions.

13 MR. EGGAN: No questions, Judge.

14 MR. PREDKO: No questions.

15 JUDGE PATTERSON: Ms. Arlaud, I want to thank you
16 very much again.

17 THE WITNESS: Thank you.

18 MR. WALLACE: Your Honor, we have one issue to
19 bring up, and it will be quite short, because we've
20 discussed it with counsel. And that is we would like to
21 request the court to visit the site, and we've proposed
22 this -- I know you thought you'd never see our smiling faces
23 again.

24 JUDGE PATTERSON: I'll miss you. Frankly, I sort
25 of anticipated that.

1 MR. WALLACE: Okay. And we're going to propose
2 some of the details of such a visit first of all to counsel,
3 and obviously it's going to be your Honor's decision
4 ultimately what this might consist of. But we're going to
5 see what we can work out among us before we present it to
6 you, if we may.

7 JUDGE PATTERSON: Okay. Do you have any idea of a
8 time frame?

9 MS. HALLEY: You have a medical procedure at some
10 point?

11 JUDGE PATTERSON: Right. That's why I brought
12 that up. I'm having surgery on August 25th.

13 MR. WALLACE: We would think after that --

14 JUDGE PATTERSON: We could do it before then.

15 MR. WALLACE: -- and when you're ready, you know.
16 That's what I would imagine.

17 JUDGE PATTERSON: We could do it before that. Or
18 it doesn't matter. I'm going to be out of commission for --

19 MS. HALLEY: How long do you think? From the
20 25th, and then for how long?

21 JUDGE PATTERSON: From what I've been told, I
22 can't do anything for two weeks, and I'm going to be
23 semi-incapacitated, gradual, for four months until complete
24 recovery. But I assume I'm not going to be totally
25 incapable for four months.

Page 8533

NetworkReporting

1-800-632-2720

1 MR. WALLACE: Well, that certainly dictates in
2 favor of doing this sooner. So we should try to get
3 something to counsel right away and get back to you and see
4 if we can schedule this.

5 JUDGE PATTERSON: Okay. So you're going to get
6 together among yourselves and get back with --

7 MR. WALLACE: We'll get together and get a
8 document to you. It might even be like a letter or some
9 proposed protocol.

10 MR. EGGAN: Your Honor --

11 JUDGE PATTERSON: I was in Manistique last
12 weekend.

13 MR. EGGAN: If we're done with that -- are we done
14 with that part of the discussion?

15 MR. WALLACE: I think so, yeah.

16 MR. EGGAN: Okay. Well, there are two exhibits
17 that we are going to offer by stipulation with counsel. If
18 you recall, during Glenn Miller's testimony there was
19 examination of Mr. Miller -- or Dr. Miller, communications
20 that he had with the State of Nevada, an issue pertaining to
21 criticism that he had gotten from the state of Nevada.

22 JUDGE PATTERSON: Right.

23 MR. EGGAN: And at that time he discussed the
24 admission of the report that generated the set two that he
25 had with Nevada as well as his written response. And I had

Page 8534

NetworkReporting

1-800-632-2720

1 a discussion with counsel for Kennecott. They have
2 stipulated to the admissibility or the admission of these
3 two documents, Petitioner's Part 31, Exhibit 47, which is a
4 document entitled "Mercury Air Concentrations in Northern
5 Nevada." This is the report that was prepared jointly by
6 Dr. Miller and others; that is Exhibit 47. And then
7 Petitioner's Part 31, Exhibit 48 would be Dr. Miller's
8 response to Nevada related to the criticisms that were
9 leveled in the letter that was presented by Kennecott, and
10 that would be -- again, that's Petitioner's Part 31, Exhibit
11 Number 48, offered by stipulations.

12 MR. LEWIS: That's right, your Honor. I don't
13 know that Mr. Reichel has been told, was he?

14 MR. EGGAN: He was not; he was not.

15 MR. LEWIS: I would not anticipate Mr. Reichel
16 would have objection, but perhaps we ought to let him
17 confirm that. So it -- perhaps it ought to be admitted
18 subject to any objection by Mr. Reichel.

19 MR. EGGAN: And I have no problem with that at
20 all. I did not consult with him on this issue, although --
21 you know what? I just don't recall whether or not he had
22 expressed a concern about it at the time.

23 MR. LEWIS: I don't either, and I just thought
24 about it now, or I would have brought it up earlier.

25 (Petitioner's Exhibits 31-47 and 31-48 received)
Page 8535

NetworkReporting

1-800-632-2720

1 MR. EGGAN: Your Honor, there was one more
2 document that was mentioned in the surrebuttal testimony
3 today, the cross-examination I did of Mr. Donohue, and
4 that's an October 28, 2003, letter from the Nicolet Minerals
5 Company to the Wisconsin Department of Natural Resources
6 withdrawing the application for the Crandon Mine Project.
7 It was discussed by Mr. Donohue. I examined him on the
8 issue. He said that he had seen the letter, although not
9 recently. We would offer -- it's a two-page document. We
10 would offer it in evidence as Petitioner's Part 31, Exhibit
11 49.

12 MR. LEWIS: Well, I think I'll object to that, you
13 Honor. I don't know that that was pertinent on a couple
14 bases; one, what we heard as far as foundation was whatever
15 Mr. Donohue said about the letter on the telephone without
16 seeing the letter. I haven't seen the letter. Still, I
17 don't know -- I didn't know what letter Mr. Egan was
18 talking about until he asked Mr. Donohue about it.
19 Secondly, as I recall the testimony from Mr. Donohue, this
20 is a letter by Nicolet Minerals Company apparently,
21 according to Mr. Donohue, after the company was purchased
22 by, I think he indicated, two local tribes. So in effect if
23 it's a letter withdrawing the permit application, it's a
24 letter doing so on behalf of the tribes who were apparently
25 opposed to the project at that time and after -- according

1 to Mr. Donohue, after they had purchased the mining project.
2 So number one, we've had no foundation or verification of
3 the letter sufficient towards admissibility. And number
4 two, I don't see that it has any relevance to Mr. Donohue's
5 testimony that we presented today.

6 MR. EGGAN: Well, this was a -- the issue of the
7 withdrawal of the permit was actually raised by Mr. Donohue
8 and through the questioning that Mr. Lewis offered. And so
9 I was offering questions to him essentially to further
10 testimony that was initiated by them. From my perspective
11 they opened the door to this. This merely substantiates the
12 questions that I was asking -- or corroborates, I guess, the
13 questions I was asking Mr. Donohue and provides some of the
14 clear evidence of the answers to the questions I was asking
15 him. I'd be happy to show it to counsel.

16 MR. LEWIS: Just one other thing, your Honor, if I
17 may. I think the principal objection here is there's been
18 no authentication of this document. That hasn't been
19 provided by Mr. Donohue other than the testimony that you
20 heard, nor is Mr. Egan able to provide that foundation.
21 And I think Mr. Donohue's testimony speaks for itself and
22 makes the point that Mr. Egan is trying to make with this
23 document, so it need not be entered to serve the purpose
24 that Mr. Egan is suggesting he wants it to serve.

25 MR. EGGAN: Well, this is a document that came
Page 8537

NetworkReporting

1-800-632-2720

1 directly from the Wisconsin Department of Natural resources
2 web site. And Mr. Donohue had indicated that he had seen
3 this letter dated October 28th of 2003. He verified some of
4 the --

5 JUDGE PATTERSON: Okay. I think there's been a
6 proper authentication of it.

7 MR. EGGAN: Thank you.

8 JUDGE PATTERSON: I'll overrule --

9 MR. EGGAN: Petitioner's Part 31, Exhibit 49, then
10 your Honor, October 28th, 2003 letter.

11 (Petitioner's Exhibit 31-49 received)

12 MR. LEWIS: Do you have a copy of that for me?

13 MR. EGGAN: I do.

14 MR. LEWIS: That's Part 31-49?

15 MR. EGGAN: It is.

16 JUDGE PATTERSON: Anything else?

17 MR. EGGAN: I don't think so, Judge. I think
18 we're all set.

19 JUDGE PATTERSON: It's over.

20 (Proceedings concluded at 3:20 p.m.)

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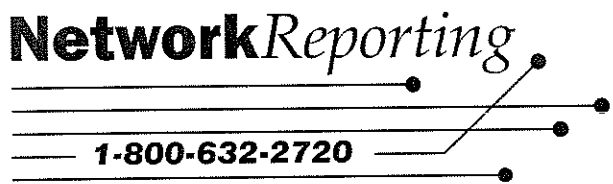
I certify that this transcript, consisting of 62 pages, is a complete, true and correct transcript of the hearing and testimony taken in this case on August 6, 2008.

August 8, 2008

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Page 8539



A
able 8503:2,3 8508:12
 8509:18 8518:10
 8528:10 8537:20
absolutely 8523:14
accepted 8488:10
accommodation
 8509:22
account 8504:16,23
 8515:23 8516:12
acoustics 8520:16
activities 8484:10
activity 8520:4
actual 8514:21
 8516:16 8518:25
add 8492:4
additional 8482:1
 8486:14
address 8502:10
adjectives 8497:2
adjustments 8504:13
ADMINISTRATIVE
 8477:2,14
admissibility 8535:2
 8537:3
admission 8534:24
 8535:2
admitted 8501:4
 8510:14 8535:17
advance 8492:9
affirm 8481:9 8500:13
affirmative 8498:3
Agency 8477:7
ago 8500:22 8512:18
agree 8487:15 8496:25
 8497:23 8501:12,15
 8501:16 8502:18
 8527:23 8528:3
agreed 8509:3
agriculture 8478:9
 8519:25
ahead 8495:10 8516:14
air 8480:5 8505:20
 8506:10 8511:8,9
 8513:11 8514:2
 8535:4
Alaska 8501:7 8502:13
 8505:11,12 8509:14
 8531:10
Alaskan 8501:23
 8524:22 8526:2
 8531:22
Alaskan-Canadian

8527:20
Alaska's 8531:25
Algom 8485:23 8486:2
 8486:3
Allegan 8477:15
allow 8490:1 8491:18
 8492:3
allowed 8489:24
 8491:20 8518:6,6
alluvial 8503:23,25
Alternatively 8506:14
American 8492:18
 8493:22,23,25
 8495:2,4,8,12,14
amount 8487:19
 8517:4 8519:5
 8523:2 8530:18
 8531:1,3,4
amounts 8531:7
analysis 8484:16
 8485:1 8487:10
Ann 8478:2
answer 8482:19,20,23
 8483:8,12,15,19,20
 8483:23 8484:1
 8495:10
answers 8537:14
answer's 8532:7
anticipate 8535:15
anticipated 8532:25
anybody 8511:24
 8519:9
apart 8516:7
apologize 8498:17
apparently 8483:2
 8508:10 8536:20,24
APPEARANCES
 8477:18
applicable 8501:20
application 8482:20
 8483:1 8484:5
 8485:10 8486:11,12
 8493:18 8494:12
 8528:22,25 8536:6
 8536:23
applies 8501:12
 8502:13,16
apply 8501:22,24
 8502:21 8503:4,14
appreciate 8513:5
appropriate 8489:16
 8498:22
appropriately 8496:18

approximately
 8485:13 8486:1
 8487:6 8505:15
 8506:22 8507:3,3,16
 8507:19 8517:14
Arbor 8478:2
area 8494:13 8522:13
 8526:17
areas 8500:25
argue 8520:2
Arlaud 8479:8 8481:6
 8499:22,23,25
 8500:2,5,7,10,15,16
 8500:21 8501:5
 8502:20 8503:13
 8505:16 8510:1,21
 8511:1,14,23
 8512:17 8525:9
 8529:3,15 8531:10
 8532:15
Arlaud's 8502:6
ascribing 8497:2
asked 8481:20 8487:18
 8488:13 8536:18
asking 8501:17
 8518:25 8521:20
 8537:12,13,14
assessment 8495:18
 8497:17
Assistant 8478:8
assume 8503:13
 8514:24 8533:24
assumed 8523:23
 8530:10
assuming 8507:21
 8524:24,25 8525:3,5
assumption 8529:25
assumptions 8522:8
 8529:22,23 8530:17
attenuation 8503:10
Attorney 8478:8
attorneys 8493:22
 8495:1
audible 8511:3,4,6,7
August 8477:16 8481:2
 8533:12
authentication
 8537:18 8538:6
aware 8485:4,7
 8520:18 8523:3
 8525:11 8528:8
 8531:16 8532:2,8
awhile 8500:12

B
back 8504:21 8509:5
 8534:3,6
backfill 8516:2,22
base 8482:24 8483:2
 8488:16,19 8519:14
based 8484:17 8487:7
 8487:10,14,16
 8491:12 8496:2,7
 8498:1 8504:5,12
 8510:3 8515:4,20
 8516:9 8517:6,13
 8518:22 8519:17,19
 8522:7 8525:7
bases 8536:14
basic 8513:12
basically 8513:19
basis 8483:10 8484:19
 8487:8,9 8488:6
 8498:13 8508:25
basts 8518:17
Bay 8477:4,19
bears 8498:2
bedrock 8490:13,14
behalf 8481:22
 8536:24
behave 8503:11
believe 8483:8,12,19
 8483:20 8484:1
 8488:15 8496:20,25
 8502:20 8510:11
 8523:11 8528:15
 8530:21
believed 8496:14,16,18
 8496:24 8499:7
believes 8502:3
best 8496:8
better 8500:6
Beuche 8478:1
beyond 8482:1
 8491:14
big 8491:24
blanket 8516:12
blankets 8517:2
blaring 8506:14
 8507:24 8511:19
blast 8504:5 8505:2
 8506:1,3,9,9,11,18
 8506:23 8507:14
 8511:9,12 8513:11
 8514:22 8515:2,15
 8515:21 8516:5,8,9
 8516:11 8517:2,15

8517:15,16,19,22
 8518:6,13 8519:4
 8520:6,7,23 8527:10
 8529:2
blasting 8500:25
 8501:8,12 8502:14
 8502:14,15,17,21
 8503:4,5,6,9,14,15
 8505:18 8506:4,5,21
 8507:9,11,24
 8509:11 8511:1,2,4
 8511:10,15,15,16
 8513:22 8516:21
 8518:8 8521:15
 8522:12,13,15,20,23
 8522:25 8523:3,5,20
 8525:4 8526:6
 8527:10,24 8528:18
 8529:5 8530:11
 8531:12 8532:2
blasts 8506:25 8507:1
 8507:2,3,4,5,6,21
 8518:17
blowing 8517:7
board 8509:17,23
BOCK 8478:8 8529:10
bodies 8503:7,8 8522:6
body 8521:25
bottom 8493:24 8503:2
 8503:4 8504:5
 8521:15,25 8524:17
bound 8483:3 8488:19
bounds 8489:5
box 8478:5,10 8506:6
bracketed 8496:18
break 8530:25
bring 8509:4 8532:19
broader 8521:20
broken 8516:7
brought 8502:1
 8531:22 8533:11
 8535:24
Bruce 8478:1 8512:17
Building 8478:10
buildings 8524:5,22
 8525:22 8526:5,17
 8526:25
built 8494:24
bunch 8508:21
burdens 8494:23
Bureau 8477:9

C

<p>calculate 8506:11 8527:13 calculated 8488:16 8503:14,18,20 8504:4 8505:1,6,9,12 8505:20,25 8514:6 8524:3,14 8527:6,22 calculates 8514:1 8518:18 calculating 8524:6 calculation 8503:19 8504:11,11,14,25 8509:16,17 8510:1,3 8510:21 8513:7 8520:14 calculations 8496:2 8504:16 8505:4 8508:10,12,15,18,20 8509:13,22 8510:20 8511:25 8513:4 8514:9 8521:11,11 8521:24 8522:7 8523:19 8527:17,18 8527:19 8529:21 8530:17 calibration 8487:14 California 8532:8 call 8512:8 called 8481:13 8485:24 8486:3 8500:17 calls 8499:21 Canada 8485:23 capacity 8482:1 8486:14 8487:25 case 8477:9 8482:12,24 8482:25 8483:2 8487:13,14,16 8488:6,16,16,19,20 8491:5 8496:11,21 8498:7,21 8499:7,8 8501:4,6,22 8502:4 8510:17 8513:17 8524:1 8530:5,6 cases 8524:21 casino 8492:19 cause 8523:4,20 8527:25 caused 8493:13 causes 8522:12,16,16 8523:9,9 causing 8523:8,13,15 8523:17 Center 8478:14</p>	<p>centimeters 8524:21 8526:4 CER 8478:17 certain 8502:17 8520:23 8523:2 certainly 8484:8 8489:18 8510:18 8534:1 Certified 8478:18 cetera 8484:18 chainsaw 8506:15 8520:9,11,15,17 chance 8531:20,24 change 8485:15 characteristics 8484:18 characterize 8508:9 charge 8504:7 8505:24 8513:15 8515:5 8516:10 8517:2 8526:22 8530:10,13 charges 8515:18 CHRISTOPHER 8478:13 circular 8506:15 circumstance 8488:21 8488:22 circumstances 8502:9 citizens 8494:21 claiming 8508:24 clarify 8501:25 cleanup 8494:23 clear 8516:18 8523:18 8537:14 clearly 8501:23 8508:16 clock 8508:4,5,5 close 8491:3 8492:18 8518:15 closer 8493:7 closest 8506:22 8517:12 Club 8477:5 8478:1 Cohn 8477:19 collar 8530:11,19 come 8487:6 8491:11 8522:20 8524:16 comes 8504:19 8506:10 8511:7 8519:3,15 8529:25 comfortable 8487:9 8488:13 coming 8512:1</p>	<p>commission 8533:18 common 8529:4 communications 8534:19 Community 8477:4,20 company 8477:7 8478:14 8480:7 8483:17 8485:23,24 8485:24 8486:3,4,7 8493:13,18 8495:7 8495:11,13,18 8536:5,20,21 company's 8485:17 compare 8505:10 8531:25 compared 8499:8 8504:25 comparison 8489:19 8506:13 complete 8495:18 8533:23 completed 8484:24 8485:1 completes 8492:23 complex 8508:10 8509:17 complicated 8509:12 8510:20 concentration 8515:9 8521:7 Concentrations 8480:5 8535:4 concern 8535:22 concerning 8481:24 8484:21 concerns 8494:6 concluded 8492:16 8498:21,24 8499:3 8538:20 conclusion 8501:18 8502:8,12,17,19 conclusions 8482:8 condition 8487:11 8488:6 8528:15 conditions 8487:15 8496:19 8520:18,22 8521:1,6 8528:4 conduct 8508:11 confirm 8518:7 8535:17 confirmed 8519:10 conjunction 8502:23 connection 8527:24</p>	<p>8528:6 conservative 8496:17 8496:23,24 8497:1,3 8497:17,18,19,19,21 8498:4,8 consider 8496:19 considered 8527:17,18 consist 8533:4 consistent 8511:20 Constitution 8477:15 constructed 8488:9 construction 8487:9 8488:2 8502:25 consult 8535:20 consultant 8484:9 contain 8486:12 CONTENTS 8479:1 contested 8491:5 context 8489:18 contingency 8487:21 8488:3,7,10 Continuing 8482:10 contributes 8490:20 control 8515:8 8516:7 conversation 8517:9 8517:21,24 8520:12 conversational 8506:24 8507:17,25 8508:3,4 8511:19 convert 8505:23 converts 8514:3 coordination 8484:11 coordinator 8484:23 copy 8495:22 copy 8538:12 corner 8518:14 Corporation 8478:18 correct 8481:19 8484:3 8485:19 8486:24 8493:20 8494:1 8495:14,23 8496:1,5 8496:9,13 8498:11 8498:20 8499:5,11 8500:22 8501:1 8506:18 8508:2 8515:10 8517:18 8522:1,2,9,13,17 8523:10 8524:7,11 8525:12,15 8527:3 correspond 8521:3 corroborates 8537:12 costs 8494:23 counsel 8502:18</p>	<p>8509:7,15 8510:2,7 8532:20 8533:2 8534:3,17 8535:1 8537:15 country 8532:6 couple 8527:16 8536:13 court 8500:24 8502:16 8510:1,22 8524:1 8531:18 8532:21 court's 8482:6 Crandon 8481:25 8482:14,15,16,18,22 8483:20 8484:7,9 8485:6,10,20,24 8486:8 8488:15,21 8488:22,24 8489:10 8489:18,19,21 8490:6,8,10,17,21,23 8491:17,19,23 8492:8 8495:15,16 8495:22 8499:6 8536:6 create 8514:18 creates 8515:21 creating 8530:4 creek 8504:6,10 8521:16 8525:7 8526:8 8527:9 critical 8494:2 criticism 8494:11 8534:21 criticisms 8535:8 copper 8495:22 cross-examination 8479:6,10,10 8493:1 8509:24 8510:19 8512:15 8529:13 8536:3 cross-examine 8508:13 8508:16,20 8510:3 8510:12,14,18 current 8488:18 8506:8 curtail 8491:20 cut 8506:6 cuttings 8503:7 CV 8501:4 cycle 8507:4</p>
---	---	--	--	--

D

damage 8515:24
8516:2,2 8520:1,5
8521:10,11,14,19

8522:3,6,9,12,16,17 8522:19,23,25 8523:2,4,6,8,9,13 8523:15,17,20,25 8524:4,10 8526:25 8527:25 8528:1 8529:1,5 damages 8516:1 dampening 8515:19 DANIEL 8478:8 data 8483:18 8518:23 dated 8493:16 8494:5 8538:3 day 8507:3,7,21,24 days 8507:22,23 deal 8521:21 debating 8531:22 decibel 8513:8 8519:18 decibels 8505:23 8506:1,11,12,13,15 8506:23,25 8507:16 8507:16 8511:19 8514:4,11,13,23 8517:16 8519:18,21 8519:23 decided 8491:6 decision 8487:23 8533:3 deep 8490:13 defending 8525:24 8526:1,1 delay 8504:7 8505:24 8521:2 8530:16 delays 8515:17 8519:8 densities 8523:24 density 8503:24 8504:1 8504:2 8526:24 8530:8,9 Department 8477:7 8478:8 8483:11,14 8496:15 8536:5 8538:1 depend 8526:21,22 depending 8523:11 8525:12,15 deposit 8490:9,17,18 8490:22 deposition 8508:15 deposits 8485:21 depth 8490:12 8507:20 8514:16 8530:19 8531:7 DEQ 8491:11	derive 8521:24 described 8503:21 8504:3 describes 8487:21 design 8483:10 8484:6 8484:19 8486:14 8487:8,9 8498:13 designed 8482:2 8484:18 8494:24 detail 8528:25 detailed 8495:18 details 8533:2 determine 8522:7 8524:10 determines 8521:8 detonated 8513:15 8526:23 8529:24 detonation 8513:18 8515:5 8527:11 detonator 8513:15,23 8515:5,21 8516:10 8517:2,5 8525:8 8526:23 8530:16 8531:2 developed 8487:22 8502:25 development 8505:21 8507:2 8511:15 8513:21 8518:13 devices 8516:23 dial-up 8481:5 diameter 8530:13 dictates 8534:1 difference 8499:9 8503:10 differences 8490:19 different 8483:24 8485:12,16 8490:18 8504:19 8516:1 8519:3 8521:19 differently 8503:11 difficulty 8493:6 dilution 8519:7 direct 8479:6,9 8481:15 8489:6 8492:23 8500:19 direction 8504:18 8526:10 directly 8481:21 8505:25 8538:1 disagreed 8498:25 8499:1 discharge 8477:5	8482:20 8483:4 8484:5 8486:11,12 discuss 8531:19 discussed 8532:20 8534:23 8536:7 discussion 8523:13 8534:14 8535:1 discussions 8524:13 displacement 8506:10 8511:8 dissipate 8507:11,25 distance 8504:5 8507:13 8511:9 8513:16 8527:8,9,12 8529:6 distributed 8516:6 divided 8513:16,24 8514:7 Division 8478:9 DNR 8480:7 8482:1 8486:14,16,23,25 8487:8,21 8488:5,10 8489:14 8498:18,21 8499:6 DNR's 8487:3 document 8486:20 8497:4 8498:1 8534:8 8535:4 8536:2,9 8537:18,23 8537:25 documentary 8486:19 documentation 8486:15 documents 8483:23 8496:15 8535:3 Dog 8477:6 8478:5 8529:16 doing 8508:14 8509:2 8534:2 8536:24 Donohue 8479:4 8481:5,11,12,17,20 8482:10 8483:25 8484:2 8486:11 8488:11 8489:14 8490:2,24 8491:8,8 8492:14,22 8493:3 8493:10 8495:10 8499:16,17,18 8536:3,7,15,18,19,21 8537:1,7,13,19 8538:2 Donohue's 8537:4,21 door 8537:11	dots 8514:10 Dr 8480:6 8481:11,21 8481:24 8482:2,10 8485:3 8486:10,13 8486:17,23 8489:6,7 8491:15,17 8534:19 8535:6,7 draft 8491:3 8501:7 8502:13,21,22 8503:13 8505:11,12 8509:14 8524:22 8526:1,2 8531:11 drill 8521:3 drop 8507:15 8508:3 drops 8507:12,17 drop-off 8507:13 due 8481:8 8490:16,19	8538:7,9,13,15,17 eggs 8522:4,12 EIS 8491:3 either 8486:7 8491:12 8491:24 8508:24 8524:22 8535:23 elected 8487:7,20 electric 8508:5 Electronic 8478:18 emitted 8505:17,18 employees 8520:1 emulsion 8519:6 8521:7 ended 8491:3 8493:12 energy 8504:20 engineering 8494:3,11 8496:8 8500:25 engineers 8483:24 entered 8486:22 8537:23 entire 8528:22 entirely 8508:8 entitled 8491:25 8497:11 8535:4 enveloped 8494:13 environment 8478:9 8526:14 Environmental 8477:6 8477:8 8478:9 equals 8514:10 equates 8519:22 equation 8513:13,14 8513:19,20,25 8514:2,4 8515:19,22 8518:23,24 8520:16 equations 8504:8,12 8518:23 8524:8 equipment 8518:3,21 8518:25 8519:9,11 8520:8 ERIC 8477:19 essence 8491:4 essentially 8483:22 8485:12 8493:13 8495:24 8537:9 estimate 8484:12 8487:4,5,12,17 8498:4 estimated 8482:25 8496:3,6 estimates 8483:3 8496:16 8498:7 et 8484:18
E				
Eagle 8477:7 8478:13 8488:17,23 8489:19 8490:6,7,10,18,22 8503:16 8505:19 8517:7,19 8518:10 8519:5,6,7,9 8523:20 8525:4 8526:8 earlier 8481:17 8498:11 8504:17 8509:3 8514:18 8535:24 ears 8520:8,10 east 8490:11 eastern 8505:21 8514:19 8517:17,23 8518:7 edification 8491:22 effect 8503:10 8515:20 8519:16 8520:16 8536:22 effective 8508:16 effects 8515:8 8516:21 effort 8486:5 8487:11 8518:2 efforts 8485:13,16,18 Eggan 8477:19 8479:6 8488:25 8489:2,4,17 8491:7 8492:4,24 8493:2,4 8499:12,18 8529:9 8532:13 8534:10,13,16,23 8535:14,19 8536:1 8536:17 8537:6,20 8537:22,24,25				

evaluate 8487:24
 event 8487:19
 eventually 8494:20,23
 everybody 8499:24
 8500:1
 evidence 8486:22
 8502:3 8536:10
 8537:14
 exactly 8486:21
 8510:16 8520:20
 exam 8492:23
 examination 8479:6,9
 8481:15 8482:9
 8500:19 8534:19
 examine 8485:2
 8509:23
 examined 8536:7
 example 8522:4
 excavate 8506:6
 exceeding 8489:5
 excuse 8496:11
 8497:13 8526:14
 executive 8519:22
 executives 8519:21
 exercise 8530:22
 Exhibit 8480:1,4,5,6
 8535:3,6,7,10
 8536:10 8538:9,11
 exhibits 8534:16
 8535:25
 expect 8527:13
 expected 8503:15,19
 8505:20 8517:13
 experience 8511:11,14
 8518:12 8519:13
 experimenting 8518:9
 expert 8502:15
 8509:11 8522:14
 expertise 8500:24
 explain 8484:4 8487:2
 8490:4
 explained 8492:14
 exploded 8519:1
 exploration 8502:23
 explosion 8515:18
 explosive 8519:12
 8520:4 8529:23
 explosives 8500:25
 8502:23 8503:1
 8513:17,22 8514:25
 8515:9,9,12 8517:4
 8519:6 8521:3
 8525:8 8530:9,13,19

8531:1,7
 exponentially 8507:12
 expressed 8525:16,17
 8535:22
 extreme 8487:11
 extremely 8487:19
 8526:12,14
 Exxon 8485:23 8486:2

F

F 8478:4
 face 8506:7,9
 faced 8494:23
 faces 8532:22
 facsimile 8512:24
 fact 8490:16 8491:12
 8509:20 8516:16
 8525:11
 factors 8516:19
 factual 8502:9
 failed 8494:20
 fair 8508:23
 fairly 8510:11
 familiar 8501:9
 8502:15 8528:4,14
 far 8491:1 8492:14
 8528:10,13 8536:14
 Fassbender 8482:11
 favor 8534:2
 fax 8510:1,21 8511:25
 8512:4,8,24
 features 8494:3,11
 Federation 8477:5
 8478:5,6 8529:16
 feeding 8506:16
 feet 8490:13 8519:10
 8520:12
 felt 8488:13
 fence 8506:21,22
 8507:1 8508:2
 8517:7,13,16,20,23
 field 8505:7 8511:21
 8530:24
 File 8477:3
 fill 8491:25
 films 8519:2
 financial 8492:20
 find 8510:19
 fine 8526:20
 finish 8492:2
 first 8481:5 8486:1
 8491:9 8497:10,13
 8497:14 8502:11

8506:1,3,9 8509:1
 8512:23,24 8513:11
 8513:20 8514:4
 8515:7,25 8516:19
 8517:14,15,16
 8533:2
 fish 8501:8 8522:4,6,9
 8522:12,12,14,15,19
 8522:22 8523:2,7,13
 8523:15
 Floor 8478:10
 Florida 8531:13,14,23
 flow 8483:3 8484:13
 8496:21 8498:19
 8513:19
 folks 8485:1
 followed 8481:6
 following 8527:15
 forego 8502:6
 formed 8485:22,24
 8486:3 8490:18
 formula 8517:6 8518:3
 8518:5,8 8519:3
 8525:9,10
 formulas 8517:14
 8519:16
 forth 8505:11 8521:12
 Foth 8482:2 8483:20
 8484:4,8 8488:15
 8495:17 8496:2,6
 8498:12
 foundation 8536:14
 8537:2,20
 four 8533:23,25
 frame 8485:9 8533:8
 Frankly 8532:24
 frequency 8524:24,25
 8525:2,3,9,10,12,15
 8525:16,19 8526:21
 8527:1,3,6,16,18,21
 8527:23 8528:1
 front 8494:7 8497:4
 full 8497:13,14
 fully 8502:16 8509:4
 function 8514:5
 further 8489:13
 8499:12,13 8527:10
 8527:10,11 8532:12
 8537:9
 furthermore 8501:19

G

gabbro 8503:24

gallon 8487:17
 8496:20,22 8498:4
 gallons 8483:9 8484:20
 8487:6,7,12 8488:3
 8488:18,19 8489:12
 8489:14 8496:7,11
 8498:12,14,22,24
 8499:3,9
 gap 8491:25
 gas 8514:5
 general 8478:8
 8511:14 8528:17
 generally 8503:18
 generate 8523:6
 generated 8517:20
 8521:15 8527:24
 8534:24
 geochemical 8484:11
 8484:14
 Geological 8477:10
 geology 8490:17
 geophysical 8503:12
 8503:21
 give 8481:10 8500:14
 8510:7
 given 8481:23 8488:14
 8501:7 8511:8
 8513:20 8516:4
 gives 8530:14,15
 Glen 8493:17
 Glenn 8480:6 8534:18
 go 8488:5 8492:5
 8495:10 8508:6
 8512:7 8513:9,11,20
 8532:6
 goes 8491:14 8515:5
 going 8484:13 8488:9
 8489:6 8490:15,15
 8492:1 8495:24
 8500:8 8501:21
 8514:20,22 8516:14
 8516:15 8517:8
 8518:9 8519:5,6,7,8
 8528:10,23 8533:1,3
 8533:4,18,22,24
 8534:5,17
 good 8529:1,3
 gotten 8534:21
 government 8525:11
 8525:13,20 8526:25
 GPM 8483:12 8488:16
 gradual 8533:23
 greater 8527:12,25

ground 8505:25
 8511:3,5 8516:13
 groundwater 8477:4
 8484:11,12,24,25
 8495:19 8498:19
 guess 8483:1,4,10
 8518:24 8537:12
 guys 8531:21
 GW1810162 8477:3

H

Hall 8477:15
 Halley 8478:4 8479:10
 8499:15 8501:17,23
 8502:8 8529:11,14
 8529:15 8532:12
 8533:9,19
 handed 8508:19
 8512:23
 hands 8510:6
 handwritten 8510:3
 8512:25 8513:9
 hang 8489:2,2 8491:8
 8491:8
 happen 8483:21
 8487:2 8508:23
 happened 8491:19,22
 8492:15
 happy 8537:15
 harbor 8503:5
 Hathaway 8478:1
 head 8509:20 8526:10
 health 8519:20,22
 hear 8499:23 8500:1,4
 8500:5,6,9 8511:9
 heard 8511:12 8518:17
 8536:14 8537:20
 hearing 8477:13
 8491:5 8493:6
 8510:23 8518:20
 8519:19 8520:1,5,9
 HEARINGS 8477:2
 hearsay 8491:13,13
 help 8516:23
 Hi 8529:18
 high 8483:3 8499:3
 8502:23 8525:19
 8527:1
 higher 8487:4 8488:4
 8530:7
 highest 8530:25
 highly 8494:21
 hole 8517:4 8529:24,25

8530:3,6,7,13,18,19
8531:7,8
holes 8513:21 8516:6
8517:4 8530:3,11
Hollywood 8519:14
Honigman 8477:19
Honor 8481:4,5
8488:25 8489:4,16
8489:23 8491:7,21
8492:4,23 8499:12
8499:14 8501:3,17
8502:11 8508:6
8509:1,25 8510:15
8532:18 8534:10
8535:12 8536:1,13
8537:16 8538:10
Honor's 8533:3
Hooper 8478:1
house 8506:16
human 8517:21
8519:11 8520:12
Huron 8477:4 8478:1
hydrogeology 8484:25
hydrologist 8483:22
hydrophone 8505:3,7

I

idea 8529:1 8533:7
IDENTIFIED 8480:3
Illinois 8532:1
imagine 8533:16
implication 8491:24
8521:19
important 8526:14
impression 8519:2
incapable 8533:25
inches 8524:18,19,20
8525:13 8526:3
8527:1,2,5,7
including 8484:10
8530:18
incorrect 8491:24
increase 8483:5
increased 8483:5
8507:13
INDEX 8480:1
Indian 8477:4,19
indicate 8483:17
indicated 8488:15
8493:11 8495:15
8498:17 8536:22
8538:2
industry 8519:25,25

inflow 8482:16,18,25
8483:4,7 8484:17
8485:2 8487:5,12,22
8487:24 8488:4,18
8489:12 8490:5,5
8495:19 8497:16,17
8498:7
inflows 8482:23 8496:3
8496:6
information 8482:15
8484:15 8486:13,18
initial 8505:21 8506:4
8506:21 8507:2,9
8517:15
initially 8485:22
8521:8
initiated 8491:4
8537:10
initiation 8516:25
input 8482:22 8483:18
instances 8502:25
instantaneous 8522:18
8523:1 8526:7
integrated 8504:8
intend 8528:20,21
interest 8486:2
interface 8504:9,19
interpose 8508:7
Intervenor 8478:13
8479:3 8481:14
8500:18 8501:4
intimately 8528:14
Introduction 8497:11
investigations 8484:24
involved 8485:3,6,13
8495:17
involvement 8484:5
8485:17 8486:8
irrelevant 8502:9
irreplaceable 8494:14
issue 8489:7 8516:2
8520:19 8527:8
8529:7 8532:18
8534:20 8535:20
8536:8 8537:6
issued 8477:7 8491:3
8525:13 8528:13
issues 8502:4,6

J

J 8477:19 8478:13
Jack 8501:6
Jane 8479:8 8499:22

8500:16
Jersey 8532:5
joint 8485:22
jointly 8535:5
Judd 8478:14
Judge 8477:14 8481:3
8481:7 8489:3
8490:1 8492:3,13,24
8492:25 8499:17,23
8500:1,3,6,8,11
8502:18 8510:24
8512:3,5,13 8529:12
8532:13,15,24
8533:7,11,14,17,21
8534:5,11,22 8538:5
8538:8,16,17,19
July 8481:23 8482:7
justifiable 8489:21

K

Kennecott 8477:7
8478:13 8486:7
8495:25 8499:21
8503:20 8535:1,9
Keweenaw 8477:4,19
kilograms 8504:6,7
8513:14,22,23
8515:4,20 8516:10
8517:1 8525:7
8526:22 8530:14,15
kind 8487:18 8513:1
8518:13 8520:4,23
8527:15
Klingshirn 8478:17
know 8481:20 8486:21
8489:20 8491:18
8492:10 8493:6
8509:8 8512:5
8514:17 8516:2,15
8518:1,13,14,15,17
8518:20,22,22
8519:14,17,18,21,24
8520:2,3,6,10,13,14
8520:15,15,22
8521:1,6 8522:14,20
8522:21 8524:9
8526:5,6,10,12,13
8528:1,10,17 8529:7
8530:25 8532:22
8533:15 8535:13,21
8536:13,17,17

L

Lansing 8477:15,20
8478:11 8481:1
large 8504:20
larger 8488:21,22
8489:1 8490:6,8,9,14
8490:20 8511:12
late 8485:14 8491:2
LAW 8477:14
lead 8487:25
leading 8491:5
learn 8482:21
leaves 8491:24
led 8484:17 8485:16
left 8489:22 8492:11
legal 8501:18 8502:8
8502:12,17,19
length 8517:3 8529:25
8530:19
letter 8480:7 8493:16
8494:5,7,10,15,17,18
8494:25 8495:6,6
8534:8 8535:9
8536:4,8,15,16,16,17
8536:20,23,24
8537:3 8538:3,10
let's 8495:10 8521:10
8521:20 8523:16
level 8505:25 8506:8
8506:17,20,24
8507:10,13,16,24
8511:3 8513:8,19
8514:17,21,22
8517:24 8519:23
8522:6
leveled 8535:9
levels 8505:18 8510:11
8511:18
Lewis 8478:13 8479:6
8481:4,16 8489:9,22
8491:16 8492:12,22
8499:13,16 8535:12
8535:15,23 8536:12
8537:8,16 8538:12
8538:14
lies 8500:24
limit 8505:11 8521:2,7
8524:22
limited 8520:23 8531:3
8531:6
limiting 8516:2
limits 8523:25 8524:4
8524:12 8526:2,3
line 8482:7 8493:24

8506:21,22 8507:1
8508:3 8517:7,13,16
8517:20,23 8523:24
8523:24
linear 8505:22
lines 8494:15
literature 8504:23
8519:19 8523:1
little 8490:15 8491:21
8493:6 8514:10
8521:20 8531:10,11
LLP 8477:19 8478:14
local 8486:3 8536:22
log 8514:5
long 8490:12 8494:21
8507:5,19 8533:19
8533:20
longest 8530:3
look 8497:13 8508:13
8523:22 8525:19
8526:18 8527:6
8530:5
looked 8499:6 8524:10
8532:3
looking 8490:14
8497:10,23 8513:23
8529:6
looks 8512:25
lot 8504:22 8527:9,10
8527:11
loud 8506:12 8519:3
low 8527:2
lower 8504:22 8516:16
8527:14,23 8530:9
Lp 8514:4,10

M

magnify 8519:15
Main 8478:2
majority 8504:20
making 8487:23
manage 8487:18
manager 8493:17
Manistique 8534:11
manner 8490:17
March 8497:4,7
Marcy 8478:17
Marquette 8478:6
materials 8482:17,22
8483:16 8521:12
mathematical 8503:21
8505:22 8514:5
matter 8477:3 8483:19

8495:12 8500:21
 8527:6 8533:18
maximum 8504:6
 8505:24 8513:22
 8517:15
mean 8511:24 8518:3
 8518:12,16,20
 8520:13 8521:13
 8525:2
meaning 8494:22
 8505:20
means 8505:5 8507:12
meant 8525:6
measure 8513:16
 8518:2,7 8519:12
 8528:9,18 8529:2,4
measured 8504:24
measurement 8505:23
measurements 8525:5
measuring 8520:19
 8528:5
media 8504:22
medical 8533:9
medium 8516:6
mentioned 8489:17
 8536:2
Mercury 8480:5
 8535:4
mere 8491:13
merely 8537:11
met 8512:17 8529:19
Metallic 8477:6
meter 8507:20 8530:14
meters 8504:1,6
 8506:7,23 8507:14
 8511:11 8513:18,18
 8514:14,20 8517:12
 8517:20,22 8518:12
 8525:7 8530:4,12,15
Michelle 8478:4
 8529:15,18
Michigan 8477:1,15,20
 8478:2,6,8,11,15
 8481:1 8501:20,24
mike 8493:7
mile 8490:12
Miller 8477:19 8480:6
 8534:19,19 8535:6
Miller's 8534:18
 8535:7
millimeters 8524:19
 8525:14 8526:4
 8530:14

milliseconds 8503:25
 8507:6
Milwaukee 8492:20
mind 8487:16 8520:24
 8521:4
mine 8481:25 8482:14
 8482:15,16,18,22
 8483:20 8484:7,9,13
 8485:2,6,11,21
 8487:5,20,21,22
 8488:5,15 8490:6,7,7
 8490:8,23 8491:18
 8491:19,23 8492:8
 8494:3 8495:19,22
 8495:25,25 8496:3
 8496:21 8497:16,17
 8499:6 8503:16
 8505:19 8519:5,6,8,9
 8523:20 8525:4
 8526:17 8527:9
 8528:5,11 8532:2
 8536:6
mined 8490:15
Mineral 8477:6
mineralization 8496:1
Minerals 8477:7
 8478:14 8480:7
 8485:23 8486:4
 8493:12,18 8495:7
 8495:11,17 8536:4
 8536:20
miners 8520:4,6
mines 8501:1 8503:9
mining 8477:6 8485:24
 8485:24 8486:3
 8490:9 8500:25
 8502:24 8505:17
 8516:23 8519:25
 8527:24 8528:2,17
 8537:1
minus 8514:8
minute 8483:10
 8484:20 8487:7,8,12
 8487:17 8488:4,19
 8488:19 8489:15
 8496:7,12,21,22
 8498:12,14,22,25
 8499:4,9 8511:25
 8521:10 8526:14
Mischaracterizes
 8517:10
Missouri 8531:17
misters 8517:3

model 8498:19
modeling 8485:1,1
 8487:11
monitored 8487:23
months 8500:22
 8533:23,25
moons 8512:17
Mountain 8477:5
 8478:1
move 8507:11 8508:17
movies 8519:1
moving 8527:15
MP 8477:3

N

name 8512:17
National 8477:5
 8478:5,5 8529:16
Native 8492:17
 8493:21,23,25
 8495:2,4,8,12,14
Natural 8478:9
 8483:11,14 8496:16
 8536:5 8538:1
nature 8516:5
near 8503:6,7
need 8501:24 8508:7
 8509:5 8537:23
needed 8488:8
needs 8484:16
Network 8478:18
Nevada 8480:5,6
 8534:20,21,25
 8535:5,8
never 8486:22 8494:12
 8495:15 8508:22
 8532:22
new 8486:3 8493:12
 8531:15,22 8532:5
Nicolet 8480:7 8486:4
 8493:12,18 8495:6
 8495:11,17 8496:3
 8536:4,20
noise 8505:16,18
 8506:10 8507:7
 8509:11 8511:3,4,4,7
 8511:18 8515:21,24
 8516:1,4,7,12,13,21
 8516:22 8517:13,15
noisy 8516:24 8517:1
Nonferrous 8477:5
Norcross 8478:14
normal 8517:8,21

North 8477:20
Northern 8480:5
 8535:4
Nos 8477:3
notes 8513:2
notice 8483:21 8523:25
notion 8519:3
number 8484:10
 8488:4,20 8492:7
 8504:14 8505:9,10
 8510:15 8512:4,8
 8535:11 8537:2,3
numbers 8488:14,21
 8488:22 8489:9,17
 8489:20,21 8490:5,6
 8505:10 8508:21,25
 8509:8,9,10,11,13
 8510:7,10 8520:3
 8526:18,20,22
 8527:4

O

object 8491:7,9
 8501:17 8509:6
 8522:13 8536:12
objection 8489:3
 8491:9 8508:7
 8509:2 8510:25
 8517:10 8523:12
 8535:16,18 8537:17
objective 8497:11
objects 8523:10
observed 8505:1
obviously 8492:5
 8499:1 8518:22
 8519:15,17 8533:3
occasion 8529:4
occur 8507:1,2 8522:3
October 8493:11,16
 8494:5,9 8536:4
 8538:3,10
offer 8486:17 8489:19
 8534:17 8536:9,10
offered 8491:15 8492:7
 8535:11 8537:8
offering 8537:9
Office 8477:2,10
Oh 8500:8
okay 8482:21 8483:13
 8483:16,21 8492:25
 8493:9,16 8494:2,5,8
 8494:10,18 8495:15
 8495:22 8496:2,10

8496:14 8497:4,10
 8497:13,14,19,21,25
 8498:1,6,10,17
 8500:9,10 8502:22
 8503:20 8506:13,17
 8507:6 8510:24
 8512:3,8,9,10 8513:9
 8513:11 8514:13,24
 8515:2,12,17
 8516:18,23 8517:18
 8517:25 8521:6,24
 8522:7,24 8523:3
 8524:2,17 8526:20
 8527:15 8529:12,25
 8531:6 8532:12
 8533:1,7 8534:5,16
 8538:5
once 8507:14 8511:1
one-and-a-half
 8507:21
opened 8537:11
opening 8484:13
openings 8511:8
operated 8492:19
operation 8488:1,2,8
 8490:9 8505:17
 8516:24 8528:2,23
operations 8492:19
 8527:25 8528:7,19
opinions 8486:18
opportunity 8482:17
 8509:6 8510:17
opposed 8490:21,22
 8536:25
order 8530:25
ore 8490:18
orebody 8490:11,12
 8511:3
original 8514:22
Ottawa 8478:10
ought 8489:24 8491:25
 8535:16,17
outcrop 8505:22
 8506:4 8507:15
 8517:17,23 8518:7
outcroppings 8514:20
outset 8488:9
overall 8487:3
overestimate 8505:4
overpressure 8503:22
 8505:1 8513:12,13
 8521:25 8522:3,8,11
 8522:16,18,20,25

8523:6 8524:7
8526:8
overpressures 8523:2
8526:7
overpressuring 8522:6
overrule 8502:19
8510:24 8538:8
overruled 8490:1
8492:13
owned 8485:25 8495:8
8495:14
owner 8485:20
8493:12
owners 8485:20
8492:21 8493:15
ownership 8485:15

P

P 8478:8 8503:10
8504:17,17,21
page 8479:1 8480:1
8482:6 8513:11,20
8513:24 8514:3,9
8523:22
pages 8512:24,25
8513:7,9 8521:21
paragraph 8497:13,14
parent 8486:7
Parker 8501:6,11
8502:3 8509:15
Parker's 8502:2
part 8477:4 8484:12
8487:3 8489:15
8491:13 8495:16,21
8508:19 8514:4
8524:8 8528:23
8534:14 8535:3,7,10
8536:10 8538:9,14
particle 8504:4,24
8523:23 8524:3,6,9
8524:14,17 8526:19
8527:1,2,21 8528:6,9
8528:18 8529:5
particular 8483:18
8502:13
particularly 8529:22
pascals 8514:8
passage 8481:8
pattern 8515:3,15
8516:5,8,9,25 8519:4
8520:23 8521:3
PATTERSON 8477:14
8481:3,7 8489:3

8490:1 8492:3,13,25
8499:17,23 8500:1,3
8500:6,8,11 8502:18
8510:24 8512:3,5,13
8529:12 8532:15,24
8533:7,11,14,17,21
8534:5,11,22 8538:5
8538:8,16,19
peak 8504:4,24
8523:22 8524:3,6,9
8524:14,17 8526:18
8527:1,2,21 8528:6,9
8528:18 8529:5
penetrates 8504:18
people 8519:24 8520:9
percentage 8504:20
period 8485:15 8508:8
permit 8482:20,25
8484:5 8486:11,12
8493:18 8520:18,19
8520:20,22 8521:1,6
8528:4,8,12,14,15
8530:1,20 8531:3,8
8536:23 8537:7
permits 8477:7
8485:25
permitted 8490:23
8491:10 8495:16
permittee 8483:1
permitting 8485:6,12
8485:16 8486:5
8492:15,16 8495:21
perpetuity 8494:24
person 8491:11 8509:5
personal 8511:10
8518:12 8519:13
Personally 8519:12
perspective 8491:14
8537:10
pertaining 8482:15,17
8482:22,23 8534:20
pertinent 8536:13
Petitioner 8477:19
8478:1
Petitioners 8478:4
8481:22 8489:23
8491:16,23 8502:1,5
Petitioner's 8480:4,5,6
8501:6 8535:3,7,10
8535:25 8536:10
8538:9,11
Petitions 8477:4
phase 8492:7

phone 8508:14 8509:9
8509:25
physical 8521:10,11,13
8521:14 8522:13
PH.D 8479:4 8481:12
piece 8481:21
pier 8503:5
pig 8506:16
pigs 8506:16
pin 8527:16
place 8485:10 8511:2
8523:12 8528:22
places 8493:10
placing 8509:22
plan 8487:21 8488:3,7
8488:10
plans 8484:6
plant 8486:24 8487:1
8498:13 8527:12
plants 8526:11
please 8484:4 8487:2
8490:3
PO 8478:5,10
point 8482:3 8502:7
8503:12 8509:7,8
8510:25 8533:10
8537:22
pollution 8494:19
portal 8506:1,1,3,25
8507:10,14,15
8508:1,2 8513:12
8518:16,17,17
portion 8490:14
position 8517:13
possible 8524:10
8530:5
possibly 8517:2 8531:1
potential 8484:13
8495:18 8496:19
8497:17 8522:12
potentially 8487:25
8526:8
pounds 8504:7
power 8513:15,24,25
8514:1
practical 8496:11
practice 8528:17
8529:3,4
practices 8496:8
predict 8517:7
predictable 8496:10
predicted 8482:16,23
8483:7 8489:12

8490:5,5
predicting 8483:13
8488:5 8522:9
prediction 8496:22
8497:16
predictions 8488:18
8489:10 8499:7
predicts 8513:7
Predko 8478:13
8479:9 8499:21
8500:4,9,20 8501:3
8501:21 8502:1,11
8509:1,10,20,24
8510:10,15 8511:23
8512:7,10 8517:10
8523:12 8532:14
preparation 8484:6
prepared 8483:18
8508:20 8535:5
present 8531:18
8533:5
presented 8535:9
8537:5
Preserve 8477:6
8478:5 8529:17
pressure 8503:15,19
8503:22 8504:9
8505:4,6,7,21 8514:2
8514:2,3,6,7 8521:14
8523:11
pressures 8505:2
pretty 8508:9
prevention 8494:19
previously 8500:21
8524:13
Price 8478:1
prime 8484:8
principal 8537:17
pristine 8494:14
probably 8481:7
8516:16 8531:4
problem 8535:19
procedure 8533:9
proceed 8481:3
proceeding 8481:18
proceedings 8491:5
8538:20
process 8484:21
8485:3,6,10 8487:23
8492:15,16 8495:21
production 8511:10,16
8513:21 8521:15
professional 8483:22

project 8482:13 8484:9
8484:16,19 8485:15
8485:25 8486:2,4,8
8487:3,10 8488:17
8488:23,24 8490:10
8490:11,19,21
8491:2,6 8492:17,19
8492:21 8493:12,13
8493:17,21 8494:13
8494:20,24 8495:16
8495:19 8526:9
8536:6,25 8537:1
projects 8489:19
prolong 8510:5
proper 8510:17 8538:6
properties 8492:18
propose 8533:1
proposed 8485:10
8490:7,10 8494:12
8494:19 8495:19
8503:16 8505:17,19
8528:5 8532:21
8534:9
protect 8520:1 8529:1
8529:6
protection 8501:8
8519:20 8520:10
protections 8515:24
protocol 8534:9
provide 8537:20
provided 8508:15
8529:21 8537:19
provides 8537:13
proximity 8518:15
Prucha 8482:10
8485:3 8486:13,17
8486:23 8489:6,7
8491:15,17
Prucha's 8481:21,24
8482:2 8486:10
psi 8504:10,11 8505:8
8505:12
publication 8513:1
published 8518:5,8,22
8519:19,22,24
8520:3
purchase 8492:21
purchased 8493:15
8536:21 8537:1
purely 8515:4,20
8516:3,9
purporting 8513:4
purpose 8489:23

NetworkReporting

1-800-632-2720

8537:23
purposes 8483:5
pushed 8487:10
put 8491:23 8492:6
 8513:23 8514:8
 8516:11
putting 8517:2,3
PWC 8497:16
pylon 8503:5
p.m 8477:16 8481:2
 8538:20
P24148 8478:1
P32368 8477:19
P43968 8478:13
P56040 8478:13
P62637 8478:4
P71246 8478:8

Q

qualified 8502:16
quality 8477:8 8478:9
 8484:14,17
quarrying 8494:14
quarrying 8502:24
 8503:7
quarter 8486:1
question 8482:8,9,19
 8482:20 8483:7,10
 8483:13,16,19,21,24
 8490:2 8492:2
 8495:11 8521:20
 8522:15,16 8531:6
questioning 8512:1
 8537:8
questions 8488:12
 8492:24 8493:11
 8511:24 8512:20
 8529:9,10 8532:12
 8532:13,14 8537:9
quite 8532:19

R

R 8513:17
radio 8506:14 8507:24
 8508:4,5 8511:19
raised 8537:7
range 8483:8 8488:16
 8488:22 8490:5,16
 8490:20 8496:18
 8518:15,18 8530:2
ranging 8524:20
rapidly 8507:18

ratings 8519:21
read 8482:5 8528:25
 8531:12
reading 8531:12
ready 8481:3 8491:10
 8512:13 8533:15
real 8504:14 8505:10
 8505:14
reality 8505:6
realize 8508:14
reason 8491:19
reasons 8490:4
rebuttal 8489:5
 8491:14 8510:16
 8531:21
rebutting 8510:16
recall 8482:14 8490:2
 8534:18 8535:21
 8536:19
recalling 8515:7
received 8480:3
 8535:25 8538:11
recollection 8525:18
record 8489:22
 8499:20,21 8501:3
 8508:22 8512:7,12
 8523:14
recorded 8478:17
 8505:2 8519:17
Recorder 8478:18
recording 8528:11,12
recovery 8533:24
redesign 8486:16,24,25
 8489:14
reducing 8517:3
reference 8482:6
 8486:20 8488:3
 8514:7
referred 8486:11
referring 8486:21
 8497:5 8528:2
reflect 8486:16 8503:2
reflected 8504:21
reflection 8504:17
refresh 8525:18
regard 8520:21
regional 8498:19
regulated 8530:20
regulations 8531:11
Reichel 8535:13,15,18
related 8482:13,13,15
 8501:7 8535:8
relationship 8505:22

8516:1 8519:18
 8522:5
relationships 8503:21
 8504:3
relevance 8501:19
 8537:4
relevant 8502:4,5
 8509:15
remember 8483:7
 8514:18 8520:20
remind 8500:24
repeat 8490:3
report 8497:11
 8534:24 8535:5
REPORTER 8481:9
 8500:13
Reporting 8478:18
representation 8510:8
 8526:20
representatives 8495:4
representing 8493:23
 8529:15
represents 8497:16,18
 8514:16
request 8532:21
require 8483:11
 8486:25 8528:5
required 8483:5,15
 8486:16 8489:14
 8520:19
requires 8528:8,15
requiring 8482:1
 8486:14,24
reservation 8492:18
reserve 8510:4
resolved 8518:10
resources 8478:9
 8483:11,14 8494:14
 8496:16 8536:5
 8538:1
respect 8509:14
 8511:19
respond 8489:16,25
 8492:11
responded 8492:10
Respondent 8478:8
responding 8489:11
response 8480:6
 8481:21 8489:6
 8512:20 8534:25
 8535:8
restricted 8489:8
result 8487:20 8503:19

8509:12 8522:25
 8525:3
resulting 8523:19
review 8482:17,19,21
 8487:3 8498:18,18
 8510:2 8531:20,25
reviewed 8482:2
 8483:17 8484:2
 8488:12
revised 8486:4
Reynolds 8493:17,20
 8493:22 8494:15,17
 8495:1,3
re-sworn 8481:8
RICHARD 8477:14
right 8481:18 8493:14
 8495:24 8496:2,8,12
 8498:8 8506:17
 8507:25 8508:2
 8510:4 8512:9,14
 8513:3,12 8514:14
 8514:21,23,25
 8515:13,15 8517:9
 8520:7,8 8521:10,17
 8522:4,11,25
 8525:15 8530:2,20
 8531:3,8 8533:11
 8534:3,22 8535:12
Rio 8485:23 8486:2,3,7
risk 8520:4
road 8502:24 8503:7
rock 8496:1 8502:24
 8503:23 8504:18,19
 8504:21 8507:10
 8514:19 8517:8,19
 8518:10 8519:1
 8526:23,24 8530:25
RODRICK 8478:13
role 8484:21,23
roughly 8487:16
RULES 8477:2
ruling 8492:5,12

S

S 8478:2 8503:11
safe 8519:20
safety 8519:20,22
saturated 8503:23,25
saw 8483:12 8506:16
saying 8517:18,22
 8526:1,3
says 8497:18 8502:22
 8513:11 8514:9,10

scenario 8496:11,21
 8498:22 8499:8,8
 8516:4,15 8524:18
 8530:8 8531:5
schedule 8534:4
Schwartz 8477:19
second 8486:5 8489:2
 8497:14 8504:2
 8514:2,9 8523:24
 8524:18,19,19,20,21
 8525:13,14 8526:3,4
 8526:4 8527:1,2,5,7
Secondly 8536:19
seconds 8507:6,7,23
section 8482:5 8497:10
sediment 8504:9
sediments 8503:3
see 8497:10,18,20
 8502:18 8503:3
 8507:17 8508:12
 8510:20 8514:9
 8519:19 8523:22
 8525:18 8527:4
 8532:22 8533:5
 8534:3 8537:4
seeing 8525:9 8536:16
seen 8494:8 8511:21
 8518:17 8519:2
 8525:16,17 8531:14
 8536:8,16 8538:2
seismic 8502:23 8503:1
seismographically
 8528:6,24 8529:2
selected 8498:12
semi-incapacitated
 8533:23
sending 8513:5
sentence 8497:14
series 8491:5
serve 8537:23,24
set 8487:14 8503:1
 8505:11 8508:9
 8514:7,7 8521:12
 8534:24 8538:18
seven 8507:21,23
SG 8530:13
short 8532:19
shot 8508:23,23,25
shouting 8506:14
show 8523:19 8537:15
sic 8489:12 8514:10
side 8508:24
signature 8498:2

signed 8483:22	source 8486:18	statutory 8524:22	Survey 8477:11	testify 8481:20 8489:7
similar 8518:13	8519:23	steep 8507:13	suspect 8486:21	8489:7 8491:12
simple 8509:21 8510:9	sources 8508:13	Stephen 8479:4	swear 8481:9 8500:13	8520:17 8522:21,22
8510:9,11	Southfield 8478:15	8481:12 8483:25	swell 8514:17	8522:23 8526:7
simply 8488:24 8490:8	speaks 8537:21	Steve 8481:5,17	switch 8493:10	testifying 8502:12
8490:13	special 8519:16	stipulate 8501:21	sworn 8481:14	8508:8 8517:6,12
simulate 8518:2	specific 8481:21	8502:5	8500:12,18	testimony 8481:10,22
single 8526:23	8484:21,23 8489:20	stipulated 8535:2	synthesized 8484:15	8481:22 8482:2,5
single 8513:15 8515:5	specifically 8481:23,25	stipulation 8501:24	system 8481:25 8484:7	8484:1 8486:10,17
8516:10 8531:2	8482:23 8489:10	8534:17	8484:19,22 8486:16	8486:23 8489:5,11
sir 8489:2 8495:10,10	8491:17	stipulations 8535:11	8487:8 8488:1,7,9	8489:15,24 8491:14
sit 8508:14	specifies 8494:5	stope 8511:12		8491:17 8492:6,9
site 8484:25 8506:2,17	specify 8520:22	straight 8504:18	T	8498:6 8500:14
8513:8 8519:12	speculation 8491:13	8516:14	T 8478:1	8501:7,11 8502:2,6
8532:21 8538:2	speech 8506:24	stream 8524:18	table 8479:1 8491:23	8505:16 8508:19
sitting 8510:6 8518:12	8507:17,25 8508:3,4	Street 8478:2,10	tail 8492:17	8512:21 8514:18
situation 8499:6	8511:20	strike 8508:17	take 8503:9 8504:16,23	8515:7 8517:11
six 8507:21,23	Square 8477:20	strives 8502:10	8507:19 8511:25	8520:11 8523:14
six-page 8512:24	stamped 8483:23	structures 8523:9	8515:19,22 8516:12	8534:18 8536:2,19
size 8494:13 8530:18	stand 8520:7	studied 8528:1	8520:16 8530:12	8537:5,10,19,21
8531:7	standard 8501:8,9,12	studies 8484:11,11,12	taken 8519:9	tests 8503:22
slightly 8487:4	8501:22 8502:2,13	8484:14	talk 8500:8 8521:10	text 8504:4 8518:8
8490:20 8516:16	8502:15,21,22,25	study 8483:23	8523:16 8527:21	thank 8492:22 8499:17
smaller 8513:21	8503:13 8504:12	sub 8516:13	talked 8488:14	8499:18,19 8511:23
smiling 8532:22	8505:11,12,13,15	subject 8509:24	8511:18 8531:10	8512:10 8529:8
softer 8500:7	8509:14 8524:23	8535:18	talking 8485:9 8506:3	8531:10 8532:15,17
soil 8506:8 8514:21,22	8525:20,21,24	submit 8487:20	8506:4 8507:7	8538:7
sold 8486:2 8493:21	8526:2 8528:8	submitted 8483:1	8509:12 8516:3,3,20	Thanks 8512:11
solemnly 8481:9	8531:22	8486:15 8496:15	8516:20,21 8518:9	theoretical 8504:11,13
8500:13	standards 8525:11,13	substance 8514:24	8521:14,18 8525:12	8504:16 8505:3,13
solicited 8489:24	8525:19 8526:25	substantiates 8537:11	8525:21 8536:18	8530:22
solicited/elicited	8527:5,8,20 8531:13	substantiating 8486:13	target 8527:15	thing 8491:10 8516:25
8491:16	8532:2	subsurface 8503:6,11	task 8484:16	8537:16
somebody 8506:14	standing 8514:21	sufficient 8537:3	tasked 8484:10	things 8494:10
sonic 8503:24 8504:1,2	8524:10	suggest 8519:13	team 8484:24	8515:23 8516:11
soon 8491:11	start 8484:4 8512:1	8528:17,21	technology 8494:20	8519:14,16 8526:11
sooner 8534:2	8520:7 8521:21	suggested 8491:10	telephone 8509:2,4	8527:16 8528:16
sorry 8499:25 8508:5,7	starting 8482:6	suggesting 8537:24	8510:18 8536:15	think 8481:4,7 8483:24
8510:5 8513:24	starts 8500:11	suggests 8505:3	tell 8501:15 8502:16	8489:4,15,23
sort 8518:15 8532:24	state 8477:1,2 8486:15	8528:23	8502:20 8503:18	8491:18,24 8492:14
sound 8505:24 8506:13	8491:4 8494:16,22	Suite 8477:20 8478:14	8505:17 8506:12,20	8501:24 8502:8
8506:15,17,20	8503:8 8527:21	sulfide 8495:24,25	8507:10 8515:2	8508:22 8509:11
8507:10,12,13,15,25	8534:20,21	8496:1	telling 8515:23	8510:13,15 8519:1
8508:4 8510:9,11	stated 8501:11 8523:23	sure 8486:20 8509:25	term 8494:21	8525:22 8530:3
8513:17 8515:4	8524:1,12	8512:22 8513:6	terms 8489:20 8528:2	8533:13,19 8534:15
8517:7,8,20,21	statement 8501:13	surface 8490:13	testified 8481:17	8536:12,22 8537:17
8518:3,21,22,25	statements 8481:24	8502:24 8511:5,9,13	8482:12,14 8492:8	8537:21 8538:5,17
8519:9,10,10,12,15	8528:3	8513:12 8523:9	8496:14 8498:10	8538:17
8519:17,24 8520:11	states 8532:3	surgery 8533:12	8500:12,21 8501:5,6	third 8523:24
8520:19,21 8521:8	stating 8494:11	surrebuttal 8479:3	8502:3 8504:17	thought 8525:24
8528:11	8519:23	8481:13 8491:21	8506:6 8509:14	8532:22 8535:23
sounding 8516:16	statute 8501:18,19,23	8492:1,9 8500:17	8510:10 8515:8,24	three 8483:24 8504:8
sounds 8531:11	8502:9	8510:17 8536:2	8516:19,20 8521:17	8507:4 8512:24,25

8514:10
tied 8510:6
time 8481:8 8484:23
 8485:9,16 8486:2
 8488:1 8492:10
 8493:20,21 8495:8
 8495:14 8496:15
 8501:5 8508:8
 8515:7,13,25
 8524:13 8525:23
 8533:8 8534:23
 8535:22 8536:25
times 8505:5,15
 8513:14
timing 8515:17 8521:2
 8521:2
Tinto 8486:7
today 8481:20 8509:25
 8510:22,23 8512:21
 8529:21 8536:3
 8537:5
told 8507:9 8516:18
 8519:7,8 8533:21
 8535:13
totally 8533:24
Town 8478:14
Tracey 8479:8 8481:6
 8499:22 8500:4,16
 8512:7
train 8519:23
transcript 8482:7
transference 8503:22
transmitted 8504:22
treatment 8481:24
 8484:6,16,19,22
 8486:24 8487:1,8
 8488:1 8498:13
 8526:11 8527:12
trial 8508:11
tribe 8493:25 8494:2
 8495:9,12,14
tribes 8492:18 8493:22
 8493:23 8495:2,5
 8536:22,24
tried 8494:12
trough 8506:8 8514:19
 8516:14
true 8531:24
truth 8481:10 8500:14
try 8534:2
trying 8537:22
twice 8483:15
two 8485:12,16

8492:17 8522:11
 8529:11 8532:8
 8533:22 8534:16,24
 8535:3 8536:22
 8537:4
two-page 8536:9
type 8477:9 8487:23
 8502:14,17 8509:16
 8511:15 8526:23
typed 8513:2 8521:12
types 8504:20
typewritten 8521:21
typical 8505:23
 8530:11

U

Uh-huh 8498:3
ultimately 8490:23
 8492:16 8521:24
 8533:4
unanticipated 8508:18
uncertainty 8490:16
 8490:21
uncut 8530:10
underground 8501:12
 8502:13,21 8503:9
 8503:10,14,15
 8506:5 8507:11
 8511:2
understand 8492:5
 8510:8 8512:23
 8513:4 8518:24
 8525:2
understanding
 8482:24 8483:16
 8498:10 8521:13
 8522:5,18 8523:1,5
understood 8489:5
 8493:24
unfairly 8491:20
units 8525:17
upgrade 8487:25
 8488:7
upper 8482:25 8483:2
 8488:19
use 8487:7 8489:23
 8505:9,14 8513:13
 8513:20,22 8519:5,6
 8519:7,8,25 8520:9
 8521:8 8530:7,9
 8531:1,4

V

V 8479:4 8481:12
validities 8520:2
value 8504:23 8505:1
 8519:16 8521:25
 8524:6,9
values 8483:4 8519:24
 8524:16
VanDyke 8483:20
 8484:8 8495:17
 8496:3 8498:12
VanDyke's 8484:4
various 8508:11
vary 8525:12
vast 8494:13
velocities 8504:24
 8523:23 8524:4
 8526:19 8528:18
 8529:5
velocity 8503:25
 8504:1,3,4 8524:6,9
 8524:14,17 8527:1,2
 8527:22 8528:6,9
venture 8485:22
verification 8537:2
verified 8538:3
versus 8502:14 8505:1
vertical 8530:11
vibration 8515:4
 8522:16 8523:3,5,8
 8523:10,13,17,19
 8525:3 8527:24
 8528:12 8529:2
vibrations 8523:15
 8526:5
vicinity 8525:22
 8526:6
view 8503:12
visit 8532:21 8533:2
voice 8519:11
volume 8477:13 8482:7
 8487:18

W

W 8478:13
walk 8517:19
Wallace 8478:1,1
 8479:10 8493:10
 8499:14 8508:6
 8509:7,18,21 8510:4
 8510:13 8511:24
 8512:4,14,16,17
 8523:16 8529:8
 8532:18 8533:1,13

8533:15 8534:1,7,15
want 8492:11 8500:11
 8509:25 8513:16
 8514:5 8516:18
 8523:12,18 8532:15
wanted 8488:14
 8490:4 8508:18
wants 8510:20 8537:24
Warner 8478:14
Washington 8477:20
 8532:10
wasn't 8483:2 8493:17
 8493:25 8494:16
 8495:22 8499:9
 8516:20
wastewater 8498:13
 8526:11 8527:11,12
watched 8519:1
water 8477:9 8481:24
 8484:6,13,14,15,17
 8484:18,22 8486:24
 8487:1,18,19,22,25
 8494:14 8503:2,6,7
 8503:23 8504:2,10
 8505:1,2,3,4 8521:25
 8522:6,19 8523:6
Watershed 8477:6
 8478:5 8529:16
wave 8503:15,19,22
 8504:9,17,18,21
 8505:4,6,7,21 8514:2
 8514:3,6 8521:14
 8523:11
waves 8503:2,11,11,23
way 8488:8 8502:2
 8505:13 8508:16
 8511:1 8515:12,15
 8515:17 8516:8
 8524:3 8527:4
 8531:25
ways 8515:8 8522:3,11
wear 8520:8,9
web 8538:2
Wednesday 8477:16
 8481:2,23 8482:7
weekend 8534:12
weeks 8533:22
went 8489:12 8525:22
 8530:17
weren't 8483:3 8494:3
west 8477:15 8478:10
 8490:11
we'll 8492:5 8512:7

8534:7
we're 8489:4,11
 8490:14 8492:10,11
 8500:9 8505:14
 8506:24 8507:7,14
 8510:16 8513:18
 8514:20,22 8516:3,3
 8516:13 8518:5
 8521:18 8524:12
 8525:12 8526:2,3,6
 8529:6 8530:11
 8531:22 8533:1,4
 8534:13 8538:18
we've 8491:8 8495:15
 8506:7 8508:10,12
 8508:22 8512:23
 8514:18 8519:1,1
 8532:19,21 8537:2
whatsoever 8485:7
wherewithal 8492:20
wider 8490:16
Wildlife 8477:5 8478:5
 8478:6 8529:16
Williams 8478:10
willing 8509:4
wires 8512:2
Wisconsin 8480:7
 8482:13 8483:11,14
 8483:23 8491:4,11
 8494:16,22 8496:15
 8498:18,21 8499:6
 8536:5 8538:1
withdrawal 8537:7
withdrawing 8536:6
 8536:23
withdrawn 8493:13,19
 8493:24
witness 8481:13
 8499:19 8500:17
 8501:6 8508:7
 8512:9,11 8531:21
 8532:17
witnesses 8479:3
 8482:11 8492:8
 8508:11,24 8509:5
wonder 8531:12
wondering 8515:22
 8519:4 8529:21
 8531:20,24
word 8497:23
words 8516:5
work 8482:12 8520:17
 8533:5

working 8485:25
 world 8504:14 8505:10
 8505:14
 worst 8487:13,14,16
 8488:5,16 8496:11
 8496:21 8498:21
 8499:7,8 8530:4,5
 worst-case 8516:4,15
 8524:18 8530:8
 8531:5
 Wozniwicz 8488:17
 wrap 8491:18 8510:22
 wrap-up 8491:22
 writing 8510:2
 8528:22
 written 8534:25
 wrong 8498:11

X

XL 8482:7
 XLII 8477:13

Y

yeah 8489:4 8490:8
 8497:22 8513:6,10
 8514:17 8515:11,14
 8518:19 8521:23
 8526:16 8529:4
 8534:15
 Yellow 8477:6 8478:5
 8529:16
 York 8531:15,23

Z

zinc 8495:22

0

0-0-0 8538:21
 0.23 8524:19
 008 8524:20
 01 8477:3
 08 8524:20

1

1 8504:2
 1-meter 8530:10
 1-800-632-2720
 8478:19
 1.15 8530:9,13
 1.2 8514:1
 1.5 8504:10,11 8505:6
 8505:9,13 8507:3
 1.67 8514:2,6

1/2 8513:16,24,25
 1:00 8477:16
 1:04 8481:2
 10 8505:5 8511:11
 8514:5,8,8
 10-28-03 8480:7
 100 8519:23
 102 8530:14
 102-mill 8530:6
 110 8504:6 8525:7
 1200 8487:12,16,17
 8498:22,24 8499:3
 126 8478:2
 13 8497:4,7
 1463 8504:2
 15 8482:8 8505:8,10
 150 8519:10 8520:11
 1500 8483:12,15
 8488:3 8489:14
 16 8481:23 8482:7
 1700 8504:1
 18 8489:12 8505:15
 19 8486:5
 1993 8485:14,22
 1998 8486:1,5

2

2 8506:15 8513:20,24
 8514:3 8524:20
 8526:25
 2,000 8490:13
 2.1 8504:1
 2.7 8505:12
 2.8 8506:7 8513:17,18
 8513:24,25 8514:14
 8514:20
 20 8514:5
 2000 8478:14 8497:8
 2001 8497:4,7
 2003 8485:14 8486:6
 8491:2 8493:16
 8494:5,9 8536:4
 8538:3,10
 2007 8477:3
 2008 8477:16 8481:2
 8481:23 8482:7
 210 8488:19
 222 8477:20
 23 8527:5
 230.5 8504:7 8525:7
 8530:15
 24-meter 8530:12
 24.5 8530:15

248 8478:15
 25th 8533:12,20
 25.5 8530:4
 25.5-meter 8530:6,12
 2700 8478:14
 28 8536:4
 28th 8493:16 8494:5
 8538:3,10

3

3 8503:24
 3.3 8513:14
 3:20 8538:20
 30755 8478:10
 31 8477:4 8535:3,7,10
 8536:10 8538:9
 31-47 8480:4 8535:25
 31-48 8480:5 8535:25
 31-49 8480:6 8538:11
 8538:14
 34.4 8530:12
 361-0520 8478:6
 37.2 8507:14
 373-7540 8478:11
 377-0726 8477:21
 38 8507:19

4

4 8513:22,22,23,25
 4-inch 8530:6
 400 8477:20 8483:8,13
 8489:12
 42 8477:13
 43 8514:13
 450 8487:6 8488:16
 8496:7 8499:9
 47 8535:3,6
 48 8535:7,11
 48-hour 8507:4
 48075 8478:15
 48104-1945 8478:2
 48909 8478:11
 48933-1800 8477:20
 49 8536:11 8538:9
 49855 8478:6

5

5 8518:12 8527:2
 508 8504:7
 517 8477:21 8478:11
 525 8477:15 8478:10
 55 8506:22 8517:12,20
 8517:22

58 8524:19

6

6 8477:16 8481:2
 8514:8
 6th 8478:10
 6,996 8503:25
 60 8488:18
 600 8483:9 8484:20
 8487:7 8498:14,17
 632 8477:5
 650 8498:11,15
 662-4426 8478:3
 67 8506:23,25 8517:14
 8517:16
 6924 8478:17

7

72 8507:16
 734 8478:3
 75 8501:4
 750 8496:11,20,22
 8498:4
 775 8487:6 8488:16
 784-5000 8478:15

8

8 8507:6
 8,000 8507:6
 80 8505:5
 800 8483:8,14
 8375 8482:6
 8481 8479:6
 8493 8479:6
 8500 8479:9
 8512 8479:10
 8529 8479:10
 8535 8480:4,5
 8538 8480:6
 89.43 8514:10

9

9.4 8530:14
 906 8478:6
 914 8478:5
 93 8486:1
 98 8485:14,14 8506:1
 8506:11,12,13,25
 8507:15 8513:8
 8514:12
 98.43 8514:23