JOINT REVIEW PANEL PUBLIC HEARING

IN THE MATTER OF Application Nos. 1844520, 1902073, 001-00403427, 001-00403428, 001-00403429, 001-00403430, 001-00403431, MSL160757, MSL160758, and LOC160842 to the Alberta Energy Regulator

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GRASSY MOUNTAIN COAL PROJECT - BENGA MINING LIMITED

VOLUME 25

VIA REMOTE VIDEO

November 26, 2020

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November 26, 2020		Morning Session
A. Bolton		The Chair
D. O'Gorman		Hearing Commissioner
H. Matthews		Hearing Commissioner
M. LaCasse		AER Counsel
B. Kapel Holden		AER Counsel
K. Lambrecht, QC		Joint Review Panel Secretariat Counsel
T. Utting		IAAC Staff
E. Arruda		AER Staff
D. Campbell		AER Staff
T. Turner		AER Staff
T. Wheaton		AER Staff
A. Shukalkina		AER Staff
M. Ignasiak C. Brinker		For Benga Mining Limited
R. Warden T. Howard		For Ktunaxa Nation

K. Poitras	For Métis Nation of Alberta Region 3
Chief B. Cote	For Shuswap Indian Band
B. Snow	For Stoney Nakoda Nations
R. Drummond S. McHugh	For Government of Canada
A. Gulamhusein	For Municipality of Crowsnest Pass
M. Niven, QC R. Barata J. Nijjer (Student-at-Law)	For MD of Ranchland No. 66
B. McGillivray	For Town of Pincher Creek
D. Yewchuk	For Canadian Parks and Wilderness Society, Southern Alberta Chapter
R. Secord I. Okoye	For Coalition of Alberta Wilderness Association, Grassy Mountain Group, Berdina Farms

		Ltd., Donkersgoed Feeder Limited, Sun Cured Alfalfa Cubes Inc., and Vern Emard
	R. Cooke	For Crowsnest Conservation Society
	G. Fitch, QC C. Agudelo	For Livingstone Landowners Group
	M. Sawyer	For Timberwolf Wilderness Society and Mike Judd
	(No Counsel)	For Barbara Janusz
	(No Counsel)	For Jim Rennie
	S. Elmeligi A. Morehouse S. Milligan M. Boyce	For Alberta Chapter of the Wildlife Society and the Canadian Section of the Wilderness Society
	J. Gourlay-Vallance	For Eco-Elders for Climate Action
	L. Peterson	For Trout Unlimited Canada

R. Campbell	For Coal Association of Canada
(No Counsel)	For Alistair Des Moulins
(No Counsel)	For David McIntyre
(No Counsel)	For Fred Bradley
(No Counsel)	For Gail Des Moulins
(No Counsel)	For Ken Allred
(Not Present)	
(No Counsel)	For Monica Field
S. Frank	For Oldman Watershed Council
A. Hurly	
C. Longacre, RPR, CSR(A)	Official Court Reporter

(PROCEEDINGS COMMENCED AT 9:01 AM)

Discussion

THE CHAIR: Good morning, everyone.

Just before we start, a reminder that live audio and video streams and video recordings of this proceeding are available to the public through the

AER's website and YouTube. Anyone in the virtual hearing room with their camera or microphone turned on will be captured, and images and recordings of you and your surroundings will be broadcast to a publicly available YouTube video. If you have concerns about this, please contact counsel well in advance of the time you are scheduled to participate to explain your concerns. We'll make best efforts to accommodate your concerns considering the need for an open and transparent public process.

I have a couple preliminary matters before we get started. First relates to undertakings. We did receive Undertaking Number 6 from the Livingstone Landowners Group yesterday related to the CVs for landowners, and it's been posted as CIAR Number 905.

A reminder that there are a number of undertakings outstanding, and, of course, we would encourage people to try and get these completed soon, as we are approaching the end of the evidentiary portion of the hearing. I'll just do a quick run-through of those that are still outstanding.

Undertaking Number 10 from Timberwolf related to Dr. Rasouli and the incidents of failure in mining, oil sands, dams, and operations.

Undertaking Number 20 by Benga related to changes in base flow at end-of-mine life.

Undertaking Number 22 by Benga related to flow reductions.

Undertaking Number 23 by the Coalition related to literature support for trellis-style drainage.

And then two undertakings that just occurred yesterday. Undertaking Number 24 by Benga related to wildlife report associated with the Coal Valley Mine, and Undertaking Number 25 also by Benga related to literature to support the use of bat boxes as maternity roosting habitat.

So those are the ones that are outstanding, so, again, just encourage people to try and get those completed as soon as you're able.

One other matter. We did get a request from Mr. Sawyer to file an updated report for Dr. Norman. So I don't know if Mr. Sawyer is here, but if he is, Mr. Sawyer, could you speak to what the purpose of this filing is?

Okay. Mr. Sawyer may not be in attendance right now, so we'll return to this matter when he's available.

Are there any other preliminary matters we need to deal with?

MR. COOKE: Mr. Chairman, it's Rick Cooke at CCS. We'd just like to notify the Panel that we will not be doing any cross-examination in this topic

area where you had allocated some time.
THE CHAIR: Okay. Thank you, Mr. Cooke.
Any other preliminary matters?
MR. DRUMMOND: Mr. Chair, it's Robert Drummond for the Government of Canada. I did send a message to the Panel manager yesterday. One of Health Canada's witnesses will not be available for a portion of Monday morning, and I note currently the Government of Canada panel is scheduled to start at that time. So if things continue as they appear to be and Canada would have started on Monday morning, I think it might be appropriate to ask that we be shifted, noting, of course, we're a few days away.
THE CHAIR: Right. Okay. And just so I'm clear, what's the time period in which this witness wouldn't be available? You said Monday morning?
MR. DRUMMOND: Only Monday morning, perhaps only a couple of hours, but I think I'm going to be safe and say Monday morning.
THE CHAIR: Okay. Thank you, Mr. Drummond.
MR. DRUMMOND: If that changes, I will let you know immediately.
THE CHAIR: Okay. Thank you.
Yeah, we'll keep an eye on the schedule as it -- as it unfolds and see if that timing still looks like

that would be the time Canada would appear, and if we can make an adjustment, we will.

MR. DRUMMOND: Thank you very much.

THE CHAIR: Okay. Anything else?

Okay. Hearing none, Ms. Okoye, you can continue with your cross-examination.

MS. OKOYE: Thank you. Good morning, Mr. Chair. Good morning, Panel Members. Good morning, Benga panel.

GARY HOUSTON, MIKE BARTLETT, RANDY RUDOLPH, JANET BAUMAN, DANE MCCOY, Previously Affirmed

STEVE BILAWCHUK, IAN MITCHELL, JOHN KANSAS, LINDSEY MOONEY, Previously Affirmed

(Dust, air quality, greenhouse gas emissions, noise, and light; wildlife, including migratory birds and species at risk, wildlife health, and human health risk assessment)

Ms. Okoye Cross-examines Benga Mining Limited

Q MS. OKOYE: Mr. Bilawchuk, I'd like to go back to something that we were discussing yesterday about residential receptors and the inclusion or noninclusion of some receptors in your noise modelling.

Sorry. Can you hear me all right?

A MR. BILAWCHUK: Yes, I can hear you.

Q Okay. Perfect.

All right. So what I'd like to understand from

you is in your experience conducting -- I believe you mentioned you've conducted more than a hundred noise impact assessments. So in your experience conducting those noise impact assessments, when you see a residence or a potential residence with power linked to it and features that suggest use, do you include that residence as a receptor?

A Just to clarify, I did not state that I've conducted over a hundred noise impact assessments. I had stated yesterday that I've conducted 19 assessments for --

Q Oh.

A -- mine-related operations. I just want to clarify that for the Panel.

The -- the -- the inclusion of receptors within a noise model is contingent upon the information that I am provided by the client regarding the status of that receptor. And -- and it -- it basically comes down to the requirements within Directive 38 that specify the level of permanency and the duration during which that -- that resident is -- is at that location. And so anything that we do within a noise impact assessment is -- is just based on that -- that level of information.

Q Okay. So you don't do any independent assessment, say, maybe take a look at Google -- Google Earth or Google Map and see if there's any receptor there with some

features connected to it? You don't do that as part of your data gathering before you do your noise impact assessment?

A Indeed we do. That's usually one of the first things that we do when we are looking at a noise impact assessment, is we look at the -- the location of the study area on Google Earth or Google Maps and try and determine if there are any sort of obvious residential receptors, industrial noise sources, that sort of thing within the area before we -- before we even head out to do any -- any fieldwork for -- for the project, yeah.

Q Okay. When you are given an information that does not include some receptors and you do look at, say, Google Earth and you see that there are receptors there that would qualify under the AER said Directive 38, do you include them or not?

A MR. HOUSTON: Mr. Chair, it's Gary Houston here.

As we discussed yesterday, Mr. Bilawchuk would've proceeded based on the assessment of these receptors or -- or potential receptors that was given to him by -- by Benga.

Q Mr. Houston, I understand that from his evidence, and I'm asking him another question based on what he has provided.

Mr. Bilawchuk, if you could answer my question?

A MR. BILAWCHUK: So if I understand your question correctly, you're asking if we find residents when we go out into the field that weren't previously identified, do we include them? Is that your question?
Q Yes.
A Then the answer is certainly yes. If we find a -- a residential location that appears to be an occupied dwelling, as per the AER Directive 38 criteria, then we would include them as a -- as a receptor.
Q Okay. Thank you.

So in including residences as receptors, do you inquire into whether those properties are being used for six weeks of the year or more, as you have stated before in your -- in your evidence yesterday? Do you inquire if those residences are being used for more than six weeks before you include them as receptors?
A So the vast majority of the time, it's -- it's quite obvious that it is a -- a permanently occupied dwelling. So I guess it's -- it's important for the Panel to understand, within Directive 38, there's -- there's two different classifications of "dwelling". One is a permanent dwelling, which is a -- a residential structure that somebody lives in all the time, and the other one that -- that seems to be the -- what -- what's in question here is what's known as a "seasonally occupied dwelling". And that's the one

that -- that needs to meet the criteria of -- of occupancy of at least six weeks nonconsecutive per year.

And so I can only identify residential locations where I've actually been and -- and seen a -- a structure or -- or seen that there's a house there. And, again, most of the time, it's very clear that there's a permanent resident there.

Cabins or trappers' cabins or other structures of that nature, usually we don't even know where they are. Usually we rely, as -- as Mr. Houston has indicated, upon the client to provide us that information --

MS. UTTING: Sorry. Mr. Bilawchuk, it's Tracy Utting, the Panel manager. We seem to have lost our Panel, so I'm just going to ask you to pause there, if you don't mind, till we can get them back online. Thank you.

THE CHAIR: Okay. There seemed to have been a temporary disturbance in the force. It seems to have corrected itself, I think.

MR. IGNASIAK: You still sound pretty choppy, Mr. Chair.

THE CHAIR: Okay. I appear to be back.

Do we have Mr. O'Gorman?

MR. O'GORMAN: Just reappeared as well, Mr. Chair.

THE CHAIR: Okay. Do we have everybody we need?

It appears so. Okay.

Apologies, Ms. Okoye. I'm not sure what happened there, but Mr. O'Gorman and I both got kicked out. So if you could maybe back up just a little bit and continue.

MS. OKOYE: Okay. I had asked Mr. Bilawchuk to -- now I'm trying to remember what it was that I had asked him to do 'cause I didn't have it written down.

So I think that we were talking about -- so if a residence has power linked to it and other features that suggest use, whether he would include them as receptors and whether he does inquire into whether a property is used more than six weeks -- six weeks or more in a year before he labels that receptor -- that residence as a receptor. And I believe Mr. Bilawchuk was responding to that.

Q MS. OKOYE: So, Mr. Bilawchuk, you can continue.

A MR. BILAWCHUK: Thank you.

And, again, just for the -- the benefit of -- of the Panel, and I don't know what -- at what point in time your communication dropped out, but just to reiterate, there are -- there are two categories of

"receptor" within AER Directive 38. One is a -- a permanent occupied dwelling, and one is a seasonally occupied dwelling. And the permanent occupied dwelling is usually quite obvious. It's a -- it's a house; it's a -- it's a residence where there's clear evidence that somebody is living in there full-time, and those are usually quite easy to identify with -- with a field visit.

The more difficult ones to identify are -- are cabins, trappers' cabins that sort of thing, in -- in which, most of the time (AUDIO FEED LOST) where they're located, and so we rely upon the information from -- from the client in order to identify these receptors and also to identify their -- their level of use and whether or not they meet the -- the criteria as specified in Directive 38.

Q Okay. So just remind me. Did you conduct a field visit prior to completing your NIA?

A I conducted a partial field visit. The -- the majority of the -- the fieldwork that I did was -- was within the community, the -- the town to the south, not up in the -- in the mine area itself.

Q Okay. All right. So for Mr. Emard and Mr. Watmough's residences that you identified as "Residences 301" and "302", they were seasonal residences, in your opinion?

A Information that I was provided indicated that they

were not seasonal, that they were permanent.
Q Okay. All right.
So would you be surprised if you hear that Mr. Emard's and Mr. Watmough's residences are seasonal residences?
A Whether they're permanent or seasonal makes no difference as it pertains to the -- the noise impact assessment.
Q Well, you were saying that there was a difference between whether you include a seasonal residence as a receptor based on the requirements or the directives of -- based on the requirements of Directive 38; correct?
A So --
A MR. HOUSTON: So, Mr. Chair, again, Benga would've asked Mr. Bilawchuk to consider those two sites in his report, again, based on our assessment.
Q Okay.
So, Mr. Bilawchuk, I had provided an aid to cross this morning, and I apologize for sending that to you this morning, but I believe you are aware of that. That's a noise impact assessment that was done by your -- by ACI Acoustical Consulting. So if we can have AQ3 pulled up, please. So this was prepared for the Coal Valley Resources Inc.; correct?
A MR. BILAWCHUK: That is correct.

Q And it's the same -- a type of mining, an open-cut top-of-the -- top-of-the-mountain mining; correct?
A Correct.
Q Okay. So if we go to PDF 6.
MS. UTTING: Sorry, Ms. Okoye. It's Tracy Utting again. We seem to have lost the Panel. I might --
MS. OKOYE: Oh, dear.
MS. UTTING: -- suggest we just pause there. Sorry.
THE CHAIR: Okay. I'm back. I don't know if everybody else is.
Mr. O'Gorman, are you back?
A MR. BILAWCHUK: I'm not sure if this is of importance or not, but today is Thanksgiving in the United States, and they have free Zoom for -- for anybody all day long, and given the COVID situation, I -- I think this may be part of the issue that we're having, that Zoom is just getting overloaded.
MR. MATTHEWS: Okay. Good morning, everyone. The Chair has asked me to ask for a 15-minute break until we resolve this issue. Okay. So it's 9:25 right now, so let's look at 20 to 10 to return.
MS. OKOYE: Okay.
MR. CAMPELL Mr. Matthews, it is the AER VPN that is causing the issue, so it should be limited

to AER people connecting.
MR. MATTHEWS: Okay. Thanks, Dean. Let's continue. Let's have that -- let's get back at 20 to 10.
(ADJOURNMENT)
THE CHAIR: Okay. Apologies. We're going to try this again.
So it appears that the Government of Alberta's experiencing internet issues, and it's affecting the AER's remote access system, so that's why we got kicked out. We have a workaround, we think, that we're going to try.
So, Ms. Okoye, if you could start again.
MS. OKOYE: All right.
THE CHAIR: And we'll just have to be aware that something else could happen, I guess.
MS. OKOYE: Okay. So if I may ask, I don't know where you stopped -- where you -- what you heard prior to being kicked off.
THE CHAIR: What do I recall? We were still talking about -- oh, I think the last thing I remember was there was discussion about whether Mr. Bilawchuk conducted kind of a field visit to the site before doing his assessment. That's one of the last things I recall.
MS. OKOYE: Okay. So after that, I --

what I had done is I had referred him to the AQ3, aid to cross, that I sent over this morning, and I apologized for sending that to him this morning. So that was where we stopped. And I referred to PDF 6 of the document, and that's what you have on the screen right now.

Q MS. OKOYE: So, Mr. Bilawchuk -- so if you look at the screen, on the second paragraph, it says: (as read)

> Residential receptors in the area include two trappers' cabins located approximately 8.3 kilometres southeast of the plant and approximately 8 kilometres northwest of Robb and homes within Robb. All other trappers' cabins, camp sites, et cetera are more than 1.5 kilometres beyond the proposed MPB [mine permit boundary] and have not been included in the study. This missed the requirements of ERCB Directive 038.

And we were talking about -- you mentioned that this -- you agreed with me that this NIA was done in respect of the Coal Valley mine. You recall that, Mr. Bilawchuk?

A MR. BILAWCHUK: Yes, that is correct.

Q Okay. And in terms of dates, that was done in March 06 [sic] of 2012; correct?

A That is when the report was submitted, yes.

Q Okay. All right. So you included two trappers' cabins as -- and you identified them as "residential receptors" in this NIA; correct?
A That is correct.
Q And so trappers' cabins -- my understanding is that trappers' cabins, they are usually used occasionally, not all the time. So do they fall within your classification of "seasonal residences"?
A I -- I don't recall specifics for -- for this project; however, given the fact that we included them as part of our noise study, then it -- it stands to reason that we would been provided information by the client -- in this case, Coal Valley -- that the locations would've -- have met the AER Directive 38 criteria to be classified as a seasonally occupied dwelling.
Q Okay. So for you to -- for your inclusion of these cabins as residential receptors, you did not conduct any independent assessment before including them; is that your recollection?
A Can you be more specific regarding what -- what you mean by conduct an independent assessment?
Q We talked earlier about you -- you know, you will check Google Earth to confirm if a structure actually meets the requirements of the AER Directive 38, and you will also conduct a site visit in some cases. So -- so that's the kind of independent study I'm -- I'm asking

about. Did you do that in respect of this one before including them as residential receptors?

A No, I did not. When we include trappers' cabins for projects, typically that's not based on a -- a field visit to the site. That is just based on information that is provided by the client, and if they indicate to us that they meet the criteria, then we -- we include them.

Q Okay. So in terms of also whether these cabins are used for more than six weeks in a year, I take it you also relied on what you were provided by the proponent or by your client in this case?

A That is correct.

Q All right. So I'd like to move into something else, another area that I'd like to discuss about -- that you did in your noise modelling.

MS. OKOYE: Mr. Zoom Host, you can bring this down, and we'll get back to it later.

Q MS. OKOYE: So in your report, CIAR 42, consultant -- sorry. In your report, Consultant Number 2 -- Consultant Report Number 2, CIAR 42, PDF 9, you indicate that you used a ground absorption rating of 0.7 based on the density of ground vegetation cover in the area; is that correct? Do you remember that?

A MR. BILAWCHUK: That is correct.

Q Okay. So have you used lower ground absorption factor

in other areas with -- with more ground -- more vegetation cover?

A The level of -- or the value that we assign for ground absorption coefficient will change from project to project depending on the -- the specifics of -- of the project. So the answer to your question is, yes, I have used values that are lower than 0.7 in other projects.

Q Okay. So if we can go back again to the AQ3.

MS. OKOYE: Mr. Zoom Host, if you can pull up AQ3, and if we go to PDF 9 of the document.

Q MS. OKOYE: In the second paragraph, and not the ones in italics. So it says there: (as read)

> Due to the large size of the study area and the density of ground vegetation within the study area, vegetative sound absorption was included in the model. A ground absorption coefficient of 0.5 was used along with a temperature of 10 degrees centigrade and a relative humidity of 70 percent.

Now, in terms of ground vegetation cover between this Coal Valley project and the Grassy Mountain Coal Project, do they have similar vegetation cover?

A I don't recall the specifics of the Coal Valley study area that -- that was used for -- to form the basis of how we selected a ground absorption coefficient of 0.5.

Q Okay. But in this case, you said, "Due to the large size of the --" sorry, "Due to the density" -- and I'm focusing on the density of the ground vegetation within the study area. And then if we go to your report.

MS. OKOYE: Zoom Host, if we can pull up CIAR 42, PDF -- sorry, CIAR 42, Consultant Number 2 -- Report Number 2. So if we can take this one down and go to his actual consultant -- his actual report. Oh, there we go. Oh, sorry. PDF 9, please.

Q MS. OKOYE: So if we look at the bottom of the page, where it says: (as read)

> In addition, the ground sound absorption has been assigned a value of 0.7 based on the density of ground vegetation cover.

So in this case, you're assigning a ground vegetation cover -- sorry, a ground absorption factor of 0.7, which has -- and you've identified it as a density of ground vegetation cover for this project, and in your Coal Valley report, you also identify that there is a density of ground vegetation cover, but you assigned it a ground absorption factor of 0.5; correct?

A MR. BILAWCHUK: Correct.

Q So why the difference in the rating?

A So as stated in the reports, in each one, it's based on the density of ground vegetation cover. So density does not denote a quantity. Density just denotes that

based on the density that exists, based on what we observed during the site visits, we -- that's what forms the basis upon which we assign the ground absorption coefficient. And so in the -- in the case of -- of one, we assigned a lower value; in the Coal Valley one, we assigned a lower value. And in the Benga one, we assigned a higher value.

Q So why do you need to use the same value of 0.5?

A Again, based on the density that we observed and the differences between the two locations. And I don't recall specifics of the Coal Valley one, given that it was so long ago. I don't recall the specifics of what it was that formed that basis, other than what we've stated in the report.

Q All right. So in your experience, will a 0.7 ground absorption factor be representative of ground absorption levels when mining has commenced and vegetation has been stripped?

A So that's actually a really good question. The -- the ground absorption that is included in the model, for the most part, is -- you know, we're -- we're -- we're looking at the ground cover that's in between the mine and the residence. So we're talking about land that is not going to be mined. So it's important to note in particular that as it pertains to the -- the two residences in -- in question here, Residence 301 and

302 that are to the east of the mine permit boundary, the noise modelling source that we included for the scenario that resulted in the highest noise levels for those two locations, those noise sources were at the -- the eastern portion of the pit. And so any of the -- the removal of vegetation to the west of them is going to have a -- a minimal impact. It's -- it's the vegetation that's in between the noise sources and the receivers that is on land that is not going to be mined. That's where this ground absorption coefficient is of significance.

Q Okay. So in respect of the areas that the vegetation will be stripped -- and let's talk specifically about the areas that are close to the residences that are east of the mine pit -- the -- do you agree that the vegetation will be stripped in the mine pit area?

A In the mine pit area, yes.

Q Do you also agree that the vegetation will be stripped in the south rock disposal area?

A Yes, to the extent that within a given year they are doing work within that rock disposal area. The -- the overall footprint changes from year to year.

Q So is there any particular year within the 23 years of the mine life when the south rock disposal area will not be used?

A I don't recall. That's a question you would have to

ask of -- of Benga.

A MR. HOUSTON: In fact, I can add to that, Ms. Okoye. In -- in the south dump, we'll -- we'll be basically in full reclamation mode by Year 4 or 5 of the -- of the operation. So I -- I would expect by that time we would be planting trees and grass and -- and doing activities that would be very low noise generators.

Q So, Mr. Houston -- so prior to your reclamation activities commencing, would you have stripped all of that south rock disposal area of vegetation?

A Yes.

Q Okay. Thank you.

So, Mr. Bilawchuk, so with that south rock disposal area that will be stripped of vegetation and your use of 0.7 ground absorption factor, can you explain how that would be representative of ground absorption levels during the years when the south rock disposal area and the mining pit will be actively used and stripped of vegetation?

A MR. BILAWCHUK: Again, it's important to note that within the model, we modelled the equipment on the eastern portion of that pit or the -- sorry, the rock disposal area, and so the -- the fact that the rock disposal area will have been stripped of -- of its -- its current vegetation is -- is -- doesn't impact

the -- the noise modelling results because the equipment has been assumed to be operating on the -- the eastern portion of it so that in between the equipment and the residential receptors is all area that is -- that is going to be untouched. And so any -- any stripping activity to the west of it where there's no longer any vegetation, there's no noise sources over there that will be propagating that will significantly modify the noise levels.

Further to that, if -- if the equipment is indeed operating further to the west in -- in that area that's been stripped of vegetation, the equipment will be further away from the residential receptors and will also have a reduced line of sight and -- and, depending on how far west they are, no line of sight at all because of the topography in between because of -- of the -- the topography layout of the -- of the rock dump area. So when we did the model, we picked the worst-case scenario of where that equipment could be located to result in the highest noise levels for the residential receptors.

Q So just so that I understand you clearly, so you're saying that the location where you -- where you placed the equipment that would be used, the haul trucks and all of those are on the western portion of the south rock disposal area? Is that what you're saying?

A No. On the east end.
Q On the east end.
And that east end, will that also have been stripped of vegetation?
A It might perhaps be better if we can bring up a map of that location. And let me just scan down within my report --
Q Okay.
A -- to see if I have a ...
Q We can bring up CIAR 42, Section A.
So if we go to PDF 160, I believe there's a map there. So you can -- could you explain again how the ground absorption of 0.7 with mine -- with the stripping of vegetation in that south rock disposal area will not increase the noise level?
A Sure. And if I can have, maybe, that -- that image zoomed in a little bit further, that might make it a little easier for people to see.
So the -- the area in -- outlined in orange is the -- I believe is the south rock disposal area.
Mr. Houston, can you confirm if I have that correct?
Q That's what the map says. It's --
A MR. HOUSTON: Yeah. It -- there -- there's a south rock and a central rock disposal area, the south rock being the further south.

A MR. BILAWCHUK: Right. So within the -- the southern area, the -- the equipment that we placed in terms of doing the noise impact assessment was on the -- on the far east side of that. So the -- the -- the closest location that it could be to the -- the two residential receptors.

And so in between that activity, the equipment that we've included, in between them -- the activity and the residence to the east, that is all land that will not be mined, and -- and the existing vegetation will remain, to the best of my understanding. And so the fact that the -- the area to the west of that is -- is going to be -- the vegetation will have been stripped will not impact the noise levels that are calculated for the residents to the east.

Q Okay. So you're saying that even after clearing the vegetation in the western part of that -- western part of the residences' location, if I may say it that way, that what will be left -- my understanding that what will be left will be exposed rock. Is that your understanding as well? So when you strip vegetation off of that area that you have described, what will be left will be exposed rock; correct?

A Yes, because it won't just be exposed rock. It'll also be material that has been dumped from other -- other active parts of the mine, which is what its intended

purpose is.
Q Yeah, but in the first year of operation when that stripping is occurring, right, you have -- you don't have any dumping yet. There's just stripping of the vegetation. What you have exposed will be the exposed rock; correct?
A Yes. I -- I guess so.
Q Okay. So will an exposed rocky ground have more sound reflection and propagate sound further?
A That depends entirely on where the noise source is located relative to that -- that ground, and -- and that -- yeah, it -- it depends on where the noise source is located, but yes.
Q So you have -- you will have all of those trucks working in this area, stripping the vegetation; right? And all of -- some of them will be closer to the eastern boundary of the south rock disposal area. Some will be maybe in the middle. Some will be further south. But all of that area, you will have the trucks going hard at clearing the vegetation within the south rock disposal area. You follow me?
A I follow, yes. There will be equipment that is in there that is stripping land as a part of the initial clearing process, yes.
Q So with that clearing -- so you've got all the residences in the -- you -- you -- so all the

residences are then in the east, and then you have the rocky surfaces that are exposed, and then you have all of the mine equipment, all of the haul trucks operating, going hard, and so my question is: With that situation, there is no vegetation within there to really absorb much of the noise, or if there is, it's just a little bit, a strip, outside of the south rock disposal area.

So the question is: Will -- will the sound propagate -- will there be more ground sound reflection and more noise propagation going for -- going to the east residences based on the situation that you have in that first year of operation?

A Right. So, again, the answer to that depends very much on where the equipment is -- is located because that's a -- it's a large area that we're talking about. And so the equipment, when it's on the -- again, the eastern portion of that area, closest to the residence, then the -- the ground absorption in between there and where the residents [sic] are, again, will remain as is. And as the equipment moves further to the west, so into the area that's been -- that's been cleared already, it will be further from the residential receptors. And so as it gets further away, that -- that ground absorption -- the fact that it's -- it's -- will be more reflective within that -- that rock

disposal area, the -- there will be higher, I guess, potential for sound to be -- to be propagated out; however, the equipment will be located further away. And so the -- the sensitivity of the ground absorption coefficient is -- is fairly small and certainly not in -- in line with the -- the differences in distance that we'd be talking about as the equipment is further to the west.

And so, again, the worst-case scenario will be what the equipment is operating on the eastern side closest to the residential receptors and -- and, more specifically, with more direct line of sight to the residential receptors, that that would produce the worst-case noise levels.

Q Okay. So following up on that, when you have the equipment on that eastern portion, why did you not then classify the ground that is stripped, mined, and -- why did you not classify the ground stripped, mined, and disposal areas as a harder surface?

A Again, because in -- in the modelling that we did, the -- the equipment was located on the eastern side. And so the -- the fact that it -- it could be potentially more reflective to the -- to the west of the operating equipment is of -- of minimal significance relative to the residential receptors to the east. So it's -- it's -- it's important to

understand the geometry of -- of all of this, of where the noise sources are located within the model relative to the receptors and then the ground cover that's in between.

Q Okay. So is there any equipment in the noise model that is the -- that is in the mining area west of the forest?

A Sorry. And -- and just one thing I -- I will answer your question. I just want to make sure that the -- the Panel is aware that the stripping activity that you're talking about within that area is also going to be limited to daytime only. And so if we're comparing to the -- the AER Directive 38 criteria, any differences associated with the ground absorption coefficient will not be remotely enough to -- to have exceedances at those residential receptors during the nighttime. There will be no stripping activity during the nighttime in those areas. I just want to make sure that's -- that's clear.

And -- and, sorry, I -- I interjected there, but could you please ask your question again that I can answer.

Q So is there any equipment in the noise model that is in the mining area west of the forest?

A Can you -- sorry. Can you specifically identify the area to which you're referring?

Q So west of -- so you said your -- you modelled the -- you modelled the equipment to be located in the eastern portion. And so I had --

A Correct.

Q And I had asked you a question before, and I said: Why didn't you then identify the area that is west of the areas where the equipment will be as a harder surface? And I don't believe -- I'm not sure what your answer was on that. Can you answer that again?

A So the answer to that was: As it pertains to the noise levels to -- or the -- the noise levels for the residents to the east, the -- having a harder surface to the west was not of really any significance in terms of the -- the noise levels.

The other thing to consider as well is that the -- the ground absorption coefficient and the -- the impact that it will have on the sound propagation over distance also depends on the topography that's -- that's in between, and -- and what I mean by "topography" are the elevation contours that are -- that are in between. And so the noise model takes into account not just the ground absorption coefficient, but also the -- the elevation contours that we have been provided for the various modelling years. And all of that comes into play in -- in doing the calculation. And so, again, the -- the differences between, for

example, .5 -- 0.5 and 0.7 for -- for this particular scenario for -- in particular for these residents to the east is of -- is of little significance. And, again, the activity to which you were recently referring is -- is daytime activity only.

Q But in terms of -- okay. So when you consider the topography, do you -- did you also take into consideration the exact locations of the residences to the east in relation to that topography?

A Yes.

Q And where that --

A So I'm provided with -- with the elevation contours for the entire study area extending well beyond our calculation area, including, certainly, in between the -- the activity in the mine and -- and the residential receptors and beyond, and then the location of the receptors, the -- the coordinates are put into the model when it does the calculation. So the -- the noise modelling calculation takes all of the elevation contours in between each noise source and each receptor into -- into account.

Q Okay. So -- so when you -- okay. So I'm not sure if I got that correct, that when you move the equipment -- so you model the equipment all to be on the eastern portion of the south rock disposal area, for instance. So when you move them to the west -- or did you

actually model whether there's any equipment operated in that western section? Did you, or no?

A No. And the reason that we didn't is because, again, of the -- the topography of -- of the situation. I guess it -- it's important for the Panel to understand that the rock disposal area, as it gets built up over years, is -- is -- is essentially like a big, flat, sort of, bench. And as one moves further to the west, the -- there's no longer a direct line of sight between the -- the -- the -- the equipment that could be operating on the western part of the rock disposal area and the residence. The -- the -- the -- think of the equipment sitting on top of a shelf and you move it further to the back of the shelf, and you're at an elevation lower than the shelf, looking up at it. And so when the -- when the noise sources are at the edge of the shelf, there's -- there's going to be line of sight towards the residence, and as they move further back, not only is the noise source now moved further away from the residential receptor, which is going to reduce the noise levels, it also now has lost the line of sight, which is going to help to even further reduce the noise levels, which is why when we do the noise modelling, we model it at that easternmost location which gives us the -- the worst-case scenario because we're at -- at the closest distance physically, and we

also have the most line of sight towards the -- from the noise sources to the receptors.

Q Okay. All right.

MS. OKOYE: Zoom Host, if you could take this exhibit down, please.

Q MS. OKOYE: So going back to your report, Consultant Report Number 2. And we don't need to bring that up. So you noted that noise mitigation is required as soon as Year 2, and that's in PDF 32, if you're looking at it, that noise mitigation is required as soon as Year 2 when there will be increased equipment operated in the south disposal area.

Then in CIAR 70, PDF 118, Benga corrected this error by stating that Year 1 represents the highest noise levels for R301 and R302, which are Mr. Emard's and Watmoughs' residences; correct?

You are muted.

A MR. BILAWCHUK: Sorry. Yes, that is my understanding.

Q So when we go to CIAR 69 -- and we can bring that up. PDF 34.

A Sorry. I -- I want to make sure that it's -- I guess it's understood that within that report, that Consultant Report Number 2, where it says "Year 2", that's a typo. It's -- it's -- it's Year 1.

Q Yeah, I understand that. I had mentioned that when I

was --

A Okay.

Q Yeah.

Now, when you look at the response provided, Benga states: (as read)

> The results provided in Table 5.1.1, Consultant Report Number 2A, Section 5.1 represent the worst-case scenario for the two residential receptors, Residences 301 and 302. Within the model, all the equipment operated in the south disposal area has been lumped together at the far east end closest to the residence.

So I just want to understand whether you -- in terms of the equipment that you have modelled, did you include in your noise modelling all the equipment that would be -- that would be used at the south rock disposal area during construction, operation, and reclamation of the project?

A So the equipment that would've been included in the model would have been based on what we were provided by Benga as equipment that would be operating in that area. And so they -- they provide us with the -- the -- the equipment list, the identification of what sizes and types of loaders and dozers and whatever else it is, and then they indicate to us, you know, where

it's going to be generally operating. And then we take that information and -- and -- and find the worst-case noise locations with that equipment.

So -- so the answer to your question is that everything is based upon information that we've been provided in terms of equipment by -- by the client.

Q Okay. So, Mr. Houston, did you provide Mr. Bilawchuk with all equipment that would be used at the south rock disposal area during construction, operation, and reclamation of the project?

A MR. HOUSTON: So, Mr. Chair, we would've provided Mr. Bilawchuk with a list of equipment that would be operating during the most active period, and that would be when we're actively dumping rock. Obviously once you get into reclamation, there's much smaller and fewer pieces of equipment involved. And -- and so we would've gone for the most active period.

Q So in terms of numbers, how many equipment did you -- how many number of equipment did you provide to Mr. Bilawchuk?

A I -- I don't have that information.

Mr. Bilawchuk, do you have that noted somewhere in your report?

A MR. BILAWCHUK: So I don't know if the report identifies -- I'm just sort of scanning through the report as we go here -- the quantities of any

location -- or, sorry, the quantities of equipment at any given location. That -- that information would've been communicated to us, and that's -- that's what would've been included in the -- in the noise model. But we -- we haven't specifically within the report written, you know, for every scenario, for every location, this is exactly what equipment was -- was placed at that location.

Q Yeah. I understand that you didn't break it down into, you know, which one will be placed where. But in terms of the lumping -- so you said all of the equipment operated in the south disposal area has been lumped together at the far east end. So I'd like to understand how many of those did you really include in the model.

A Sure. Yeah. And, again, that's a -- that's actually an important question 'cause it -- it relates to how -- how much sort of conservatism is built into the noise model. So probably the best way to illustrate that, actually, is if we go to Consultant Report Number 2 and PDF page 39, please.

So what's -- what's shown on the screen here is the colour noise contours that were generated for the worst-case scenario for the residence to the east, which, based on our information, is -- is going to occur during Mining Year 1.

And, actually, if you can just zoom in just a -- a little bit, please, so we're a little bit -- see the residence in particular a little bit more. Perfect. Thank you.

So identified in this figure are the two residential receptors in question -- Resident 301, Resident 302 -- and the noise sources are -- are indicated there. There's the little blue plus signs that are on there. Those indicate the -- what we call the "point sources". And those are identified within the -- within the equipment information provided in the noise impact assessment. So those would include things like loaders and dozers and -- and light plants, and other things that aren't -- aren't very mobile.

The -- the blue lines that you can see that are on there, those are representative of the haul trucks and the -- the equipment that's used to maintain the haul road in between the -- the mining activity and the -- you know, wherever the material's being hauled.

And so the -- the little -- the area where there's the blue plus sign sort of clustered together closest to Resident 301, that represents that south rock dump area, and it's -- it's hard to delineate within this figure, but there are several plus signs clustered together there. Each one of those represents a noise source.

And so in an attempt to make the modelling results more conservative and -- and just to be clear, by "conservative", I mean to calculate higher noise levels -- we assume that all of the equipment is operating at that easternmost portion of that -- of that location, and that's not going to happen all the time. There's going to be times when that equipment is a little bit more spread out; some of it will be located further to the west of -- of where it is. And so in order to, again, provide a conservative estimate, we -- we lump it all together as close to those -- those residences as we can to provide that -- that generally sort of worst-case scenario of -- of noise levels.

Q So in terms of numbers, I -- I understand that you provided a number of equipment along that eastern portion. So in terms of the number, the actual number that you had modelled, how many exactly did you include?

A If you give me a minute here, I can tell you.

So based on the information, again, that we were provided by Benga at -- at that -- for that scenario that's -- that's shown on the -- on the figure on the screen here, we have one operational 34-ton hoe; we have two operational dozers; and we have, again, during the nighttime, two operational light plants; and then,

of course, the -- the haul trucks accessing the site.
Q And haul trucks, how many of them?
A So the information that we were provided indicated a number of -- I've got to figure this -- be 14 per hour, I believe. I -- I -- I'd have to -- I'd have to double-check that -- that number because the haul truck comes and goes, and so it makes noise, obviously, as it's travelling in both directions, as it's coming towards the site and coming away from the site. So the number that we use in the model is actually 28, but I believe that covers both directions, and so the number of haul trucks that would actually access it per hour would be -- would be 14 per hour, half that number.
Q Okay. So I just have a quick question on that ground -- sorry, the ground absorption factor before we continue on this. So has ACI Acoustical prepared noise models with multiple ground types -- so have you modelled in some areas 0.7 and in some areas harder at 0.3 or even 0?
A It -- yes, it -- again, it depends. It's different from study area to study area. A value of 0 would only ever be used if the land in between was -- was a body of water, like a lake or something like that.
Q M-hm.
A So, for example, when we've modelled mine activity in the past and there's a large lake that's -- that's

included within the study area, then we would assign the lake area a ground absorption coefficient of -- of 0 because water is -- is actually quite acoustically reflective. And, again, depending on the nature of the -- of the study area, we may assign different ground absorption coefficients for different regions of the area based on the information that we have.

Q Okay. So why would you not flag the areas that have been stripped, actively mined, and the disposal areas as a harder ground type, in this case, for the year that you are evaluating?

A So, again, as I have indicated several times now, the -- the equipment is located on the eastern portion of that boundary. And so the ground absorption coefficient to the west of that equipment or -- or the other way to think of it is in behind that equipment as far as -- as sound goes is of no consequence to those -- those residences to the -- to the east. It's not going to make a difference in terms of what the -- the noise modelling results are for those residents to the east.

Q So that is just based on your own assessment of it not going to make any noise difference?

A Correct. That's based on my -- my experience doing studies of this nature.

Q All right.

So in the CIAR 69, PDF 34 that we were looking at earlier, it says that the modelling results include -- so -- and in this case, it's talking about the modelling results that you provided in your Table 5.1.1, that -- your response was that the modelling results include the first noise mitigation recommendation listed in the noise report. And then in bracket you provided what that noise -- first noise mitigation is, which is: (as read)

> Where feasible, route the haul trucks (conveying waste rock and coal) along the western slope of the south disposal area such that the south disposal area itself provides noise shielding between the operating equipment and the residential receptors to the east.

So I'm just trying to understand. So in your modelling, you included -- so in your modelling, you modelled the sound power levels of all the project equipment to be used in the different phases of the project, and then you applied the first mitigation option before you produced the results that you have at Table 5.1.1 of your report, PDF 18.

A I'm sorry. I'm not sure I understand what it is that you're asking.

Q Okay. So if we -- so I had quoted for you what you had

provided at CIAR 69, PDF 34. Maybe we can pull that up, if that would help. PDF 34. So if you look at where -- after the -- in the "Response" section, you see the modelling results include the first noise mitigation recommendation listed in the noise report. And then you identified what -- that first noise mitigation that you had included in your noise modelling; correct?

A That's correct.

Q So I'm just trying to understand. So does it mean that -- so you did your modelling. You included all the sound power levels of the project equipment that will be operating in this south disposal area, and then you applied this first mitigation -- first noise mitigation recommendation, and then you produced the results at Table 5.1. Is that what happened with your -- with your modelling exercise?

A Yes. That's -- that's generally how the process works, yeah.

Q Okay. So -- so you're not -- so if we go to your results -- so we go to Table 5.1, which is at PDF 18 of CIAR 5. -- sorry, of CIAR 42, Consultant Report Number 2, PDF 18.

So the results that you've provided for Residences 301 and 302, which shows the ASL, the assumed sound level, with the application case as being

39.6 and 39.9. This is at the top of the page, the first two rows. So those already include the first mitigation; correct?

A You'll have to give me a minute just to read through the report here to confirm that.

Q Okay.

A MR. HOUSTON: Mr. Chair, Mr. Bilawchuk, the first mitigation was to route the trucks away from the eastern edge of the south rock dump, and I think that was fairly well indicated in your -- your map with the sound isopleth shown that the trucks were routed away from the eastern edge, like, directly -- directly from the west.

A MR. BILAWCHUK: Yes. I'm sorry. So I'm just -- I'm just reading it now, and that is -- that is correct. So what -- what we did in the model -- what we would've done is to -- we would've modelled it as -- as indicated with information from -- from Benga that indicated where the haul route would be sort of initially proposed, and the results of that would've indicated the noise levels to exceed the -- the permissible sound levels at the receptors. And so then we start modifying the -- the haul route to -- to see where it could go to -- to result in noise levels that were below the permissible sound levels. And that was what was provided within the report as a -- as a

mitigation option. It was -- so, you know, that's -- again, that's -- that's how we presented the results.

Q Okay.

A And -- and, again, Benga has -- has committed to doing so.

Q So if your -- okay. You've already confirmed that your modelling included -- sorry. I got distracted by that email -- included the -- the first mitigation option, which is to route the haul trucks to the western slope -- western edge of the slope, you're saying in your response to, I believe, the AER in CIAR 69 that the results you've provided in this table represent the worst-case scenario. So I'd like to understand how that is the worst-case scenario when you've already applied mitigation to it.

A Sorry. By -- I guess by "worst-case scenario", what -- what we're meaning there is the -- the highest noise levels that are anticipated at the residential receptors during the operation of -- of the mine as is proposed. And -- and as is proposed, will include the -- the mitigation that Benga has committed to. So if -- if the noise levels are going to be higher without mitigation, I guess that's not really of -- of any significance if that's not what's going to happen.

Q Okay. So are you able to produce the actual results from your modelling without the application of that

mitigation?
A Sorry. I don't understand the question.
Q Are you able to produce the results of your modelling without the mitigation applied?
A It's -- it's certainly possible, although I -- I don't know what purpose it would -- it would serve to -- to have an assessment of what the noise levels would be without mitigation if that's not what Benga is proposing to do as part of their operations. If they're -- if they're not going to operate in that fashion, then that information serves no purpose.
Q All right. So in terms of the -- okay. So your mitigation -- your first mitigation, as you've indicated, is that where feasible, you're going to route the haul trucks conveying the waste rock and the coal along the western slope of the south disposal area such that the south disposal area itself provides noise shielding between the operating equipment and the residential receptors to the east.

So I'd like to understand: Will Benga be constructing this western slope, or are you just going to be using the topographical features in the area?
A MR. HOUSTON: So I'm not sure if I understand your question, Ms. Okoye, but Benga will be developing haul roads throughout the project, and they'll be moving from time to time. But, yeah, we --

we will construct the haul roads in the areas that we've indicated.

Q So the western slope, as indicated in that first mitigation, is that going to be part of the access road or the "haul roads", as you've called it?

A Yes.

Q Okay. So in that first mitigation, it's also indicated that Benga will use that mitigation option of hauling -- of using the -- of routing the haul trucks along the western slope of the south disposal area where feasible? Correct? So given that you've already included this mitigation in the noise modelling results that was published at Table 5.1.1 of the report, why will it not be feasible to use this operation on noise mitigation?

A Mr. Chair, I think the only time that the haul trucks will be close to the eastern slope is when they're actually working directly on the eastern part of that dump, but their route -- or their access to that eastern part of the dump will be from the west.

Q Okay. All right. So looking at your second mitigation option, which is to construct the waste rock pile such that the easternmost -- easternmost areas are built up during the day, I'd like to understand from you how high or the extent or the reach of the eastern berm will be. So how high -- first of all, how high will

that eastern berm be which is part of your second mitigation? So your proposal is to build -- you have an eastern pile -- waste rock pile at the eastern boundary of the south rock disposal area, and then your first mitigation is that you're going to route the haul trucks to go along the western slope. So what I'm asked -- focusing on in my next line of questions I just -- that eastern berm that you're going to have along that eastern slope or eastern boundary of the south rock disposal area. So if you can tell me -- if we look at -- if we go back to what we were looking at, the CIAR 42, Section A.

MS. OKOYE: If you can pull that up, Mr. Zoom Host, please. Yeah. That's the right page. Thank you.

Q MS. OKOYE: So how far along that eastern boundary of the south rock disposal area will this berm be constructed?

A MR. HOUSTON: So, Mr. Chair, we were talking over the last few days about the size of lifts in -- in the rock disposal area, and -- and I -- I don't think -- I -- I think there's more work to be done there. But I think one of the smaller lifts that was proposed in our discussions yesterday or the day before were something like 10-metres -- lifts. And so the idea would be to, you know, deposit the material for

the lift on that eastern boundary first, so possibly 10 metres high, and then work back from the edge. That -- that would be the -- the idea.

Q So you're saying the maximum height of the berm will be 10 metres?

A No. I -- I said that's one of the smaller heights that we were talking about in --

Q Okay.

A -- in the last couple days, so --

Q So --

A -- that -- that could be a -- a good number to work with.

Q But in terms of the maximum, you don't know right now what the maximum will be, or you do?

A No. I think that's going to take more engineering. So I -- I think we can work with 10 metres, if you like.

Q So will that berm be constructed all along the eastern boundary of this south rock disposal area and the central rock disposal area?

A Again, Mr. Chair, I think that's a construction and engineering detail we need to work on a bit, but the idea would be to have some kind of a berm built up to shield the noise from the operation as -- for setting down rock in the eastern dump. So I don't know if it will be built for the entire length or if that's even necessary, and that's something we have to work on in

terms of a construction detail.
Q Okay. So in terms of that construction, how long will it take to construct that -- whether it's 10-metre high or something else -- berm -- high berm? How long will it take you to construct that?
A I -- I -- I'm not sure, Mr. Chair. And -- and we should note that that's -- this rock dump is going to be built in -- in many lifts, and so this would be a -- an activity that is repeated as we build from the ground up -- build the rock dump height from the ground up. So -- but in terms of a practice, trying to build up a sound barrier on the eastern side of the berm as part of that process would be something that would happen from time to time during the establishment of the rock dump.
Q So in terms of the noise modelling, did Benga or ACI Acoustical actually test the efficacy of the berm in actually reducing the noise depending on -- so if you have it at 5 metres, is it going to work in reducing the noise going to the eastern residences, or if you have it at something higher, was any kind of assessment done regarding that?
A MR. BILAWCHUK: I would've done a -- a fairly informal assessment. Once the noise model is generated, I can play with all kinds of -- of mitigation measures. And at the time of doing the

study, I would've looked at a few different options, including building a -- a berm there, and I would've done a -- sort of a quick calculation. If we throw in a berm, what -- what would be required? And it would be just more from the standpoint of: Is -- is a berm even a feasible means of -- of achieving the noise mitigation without going into specifics of exactly where and exactly how, which is -- is yet to be determined. And -- and the results of that would've indicated that, yes, a berm is a -- is a feasible means of -- of noise mitigation, especially given that the -- the noise sources associated with the -- things like the dozers are, you know -- they're -- they're a few metres aboveground. So if you start talking about berm heights of -- of 5 or 10 metres, now you have a -- a significant drop in the -- in the line of sight and a significant potential barrier effect there. So, yes, it's -- it's definitely a -- a viable means of -- of noise mitigation.

Q Okay. So what would Benga do if the proposed mitigations do not work and the permissible sound levels are above the levels permitted by Directive 38 for my clients and Ms. Gilmar, for instance?

A MR. HOUSTON: Mr. Chair, this is a -- a hypothetical question. We've modelled worst-case conditions with all the equipment sitting on the edge

of the eastern dump. We've indicated that if -- if the noise becomes a problem that we would build that eastern edge during daytime hours to minimize nighttime noise. I -- I -- you know, I -- it's hard to answer a hypothetical question like the one we've been posed.

Q Okay.

MS. OKOYE: Mr. Zoom Host, I'd like to bring up AQ2, which is a noise mark -- map markup with the residences east of the mine pit. Yeah.

Q MS. OKOYE: So earlier yesterday we were talking about the residences that are within the mine permit boundary that were not included in the noise modelling that was done. So Mr. Wallis had helped us with bringing up this map to actually put where the residences are.

So we've got Fran Gilmar being shown in the red zone, and you have Donkersgoed being shown in the green zone, and the dark-green zone, based on the legend at the bottom, is 35 to 40 dBA, and Fran Gilmar is within the 40 to 45 dBA; correct?

A MR. HOUSTON: That's what's shown on the -- on -- on this drawing, Mr. Chair.

Q Do you disagree with the location of Fran Gilmar's and Mr. Donkersgoed's residences?

A As we've discussed, Mr. Chair, I -- I -- I think whether these are dwellings or -- or seasonal dwellings

that fit the -- the AER directive is something that we -- we haven't -- we haven't landed on, we haven't agreed to. But nonetheless, we recognize that Ms. Gilmar and Mr. Donkersgoed are our neighbours, and we would -- we would work with them and -- especially if they had a complaint about the noise, we would look at what we could do to -- to mitigate that.

I -- I would add that these are worst-case situations with the equipment sitting on the east edge of the rock -- external rock pits -- rock dumps and that that is a circumstance that is going to be, Number 1, intermittent and, Number 2, only lasting during the first five or six years of the project, after which time that eastern edge will be under reclamation.

Q Yes. But Ms. Gilmar, in her testimony, indicated that she goes up to her property often and many times. She's been using it over 50 to 60 years. So the likelihood of her going up to that property and using her residence there, whether you agree or not that it's a residence, is likely. You don't disagree with that; correct?

A No, I -- I don't disagree with that.

Q And I take it you don't disagree too that her residence is located within the 40-to-45-dBA area?

A I don't agree with that, Ms. Okoye. But, again, these

are based on maximum noise levels, and if needs be, we can take additional measures like building the berm, like only working on the eastern side during day -- daytime hours, things like that, so that we don't exceed any nighttime permissible sound levels at Ms. Gilmar's residence.

Q So if after doing all -- putting in all those two mitigations you've mentioned, not working in the nighttime at the western edge of the -- of the south rock disposal area and also routing the haul trucks away from the eastern side of the -- of the south rock disposal areas, and even after doing that -- which, again, I believe Mr. Bilawchuk said his noise modelling included your first mitigation, but you still have Ms. Gilmar there with 40 to 45 dBA of nighttime noise. So what other mitigation measure are you going to undertake to ensure that the noise level there is not higher than the permissible sound level?

A So -- so, Mr. Chair, I think I'll have Mr. Bilawchuk talk about permissible nighttime sound levels. But as -- as I mentioned, Mr. Chair, we -- we can minimize the activity on the eastern side of the rock dumps. If -- if there is an issue, we can work to establish those berms we've been discussing, which is another mitigation factor that's not included in these sound levels that are shown on this map.

But maybe I'll -- I'll ask Mr. Bilawchuk to talk about nighttime permissible sound levels and -- and what they are and -- and how that compares.

Q Mr. Houston, I really don't need an explanation of the permissible sound levels for nighttime. What I'm looking at is your potential mitigation options.

You apply your first two that you've already identified. One is already applied in this noise modelling, and we are coming up with 40 to 45 dBA in the area where Ms. Gilmar's residence is, and I'm asking you -- so you've applied the first one; there is still an issue. You applied the second one, and -- which right now you have not confirmed to me the extent of the berm that you intend to put in place. So the question is: What other mitigation plan do you have to reduce the noise level?

A So I think it is pertinent that we have Mr. Bilawchuk talk about what is the nighttime permissible noise level, and that -- that will help to provide some background here.

Q Okay.

A MR. BILAWCHUK: The -- the nighttime permissible sound level in this -- in this area for the two residential receptors that have been identified, Resident 301 and 302, are -- are, indeed, 40 dBA during the nighttime. And, again, as -- as has been

discussed, the -- the -- the Gilmar location, there -- there is dispute as to whether or not this, indeed, is a residential receptor as defined by Directive 38.

And so if -- if, indeed, it turns out that this is a residential receptor, the modelling, right now, would indicate that the levels are -- are above 40 dBA requiring potentially additional noise mitigation. However, again, it's important the Panel understands that that is contingent upon whether or not this location, indeed, does meet the -- the Directive 38 definition or criteria for being considered a -- a seasonally occupied dwelling.

Q Okay.

MS. OKOYE: Mr. Chair, I'd like to mark this aid to cross as the -- as an exhibit, please.

THE CHAIR: Any concerns, Mr. Ignasiak or Mr. Brinker?

MR. BRINKER: Yeah. Mr. Chair, I do have a concern with this, and it's not so much the content. It's just the fact that -- and I appreciate that this was provided as an aid to cross, so our witnesses have had a chance to speak to it so it is different from what happened yesterday with the item that was brought in with Mr. Mayhood that we discussed. I'm just wondering if this might be better -- more appropriately put to Mr. Wallis if -- if the Coalition will be having

him before the -- the Panel in this topic block, just given that Ms. Okoye said that it was -- I believe this map was produced by Mr. Wallis. And I see it's a map produced by Cottonwood Consultants, and I'm not sure if those are -- that's the company that -- that does noise assessments or -- or not. So that's -- that's my concern.

THE CHAIR: Ms. Okoye, will Mr. Wallis be on your panel later? Could he speak to it?

MS. OKOYE: Yes, he can speak to what he did with the -- with the information, but the information there is based on -- on the consultant report, as identified in that small legend over there. So yeah, he will be in the -- he will be in this panel come either this -- later this week or Monday.

THE CHAIR: Okay. Can we maybe leave it, then, till he appears and can speak to it, and then we could mark it, if appropriate, at that time?

MS. OKOYE: Sure. We can do that.

THE CHAIR: Okay. Just -- we did get a bit of a slow start with the technical issues, but we should still take a morning break. I'm sure the court reporter's in need of one. So we can do that now; or if you have a few more questions you want to ask before the break, that would also be fine.

MS. OKOYE: Actually, I need a break.

Let's do the break now.
THE CHAIR: Okay.
MS. OKOYE: Yeah.
THE CHAIR: That makes sense.
Okay. So let's break until 11:15.
MS. OKOYE: Okay. Thank you.
THE CHAIR: Thank you.
(ADJOURNMENT)
THE CHAIR: Ms. Okoye, are you there?
MS. OKOYE: Yes, I am. Thank you.
THE CHAIR: Okay. So just before you get started, you know, we'll be looking to take a lunch break in an hour or so, so anytime between kind of 12 and 12:30 that works for you, if you can find a spot.
MS. OKOYE: I will be way done before then.
THE CHAIR: Okay.
MR. SAWYER: Mr. Chairman, Mike Sawyer here. I apologize for interrupting.
Discussion
THE CHAIR: Yeah. Go ahead.
MR. SAWYER: I understand that the matter for the corrections for -- to Dr. Norman's PowerPoint presentation were raised, and I -- I had -- I was not in attendance. Is that something we can discuss right now?

THE CHAIR: Sure. Yeah. Let's deal with that now. So, yeah, the question I had was, you know, the purpose of kind of filing an updated report. It's a bit unusual. And Mr. Ignasiak raised a concern about it yesterday when I -- again, I think you weren't here as well to speak to. So I just wanted to get an understanding from you as to what the purpose of filing the updated report is.

MR. SAWYER: Two things. I didn't hear Mr. Ignasiak's comments, but I can imagine what they are, and I understand why he would do that.

My understanding is that during Dr. Norman's presentation, she had identified a number of -- of typographical errors that had undertaken to provide a corrected version. That's one of the reasons.

The second thing is that there were some errors that were identified during cross that she has now corrected.

And then a mitigating circumstance is that she was trying to send that to me last week and had problems with her emails, and I only actually just received it yesterday. So those are -- and my understanding is that there -- other than the corrected number around the -- based on the area of the end-pit lakes, there is no new or different information that -- other than that number, which is considerably smaller than her original

submission.

So I leave it to the Chair and the Panel's discretion in terms of how they want to deal with that, sir.

THE CHAIR: Okay. Thank you, Mr. Sawyer.

Mr. Ignasiak, anything further you wanted to say before the Panel takes this away? Or Mr. Brinker? Sorry.

MR. BRINKER: Yeah. Mr. Chair, apologies. Mr. Ignasiak, as I understand, just had to step away for the remainder of the morning. I'm not sure if he had anything else to add. I think that the -- that the main objection is just that it's very inappropriate in terms of not what is usually done and there was no undertaking given to correct that. But perhaps it would be best to put this over to the afternoon if -- in case Mr. Ignasiak has anything else to add.

THE CHAIR: Okay. We'll wait to hear from Mr. Ignasiak before the Panel makes a determination.

MR. SAWYER: So on that point, Mr. Chairman, I'm not going to be in attendance this afternoon, and so I'll just tell you now that I've made my submissions, and once you hear from Mr. Ignasiak, you know, we'll respect whatever decision you make.

THE CHAIR: Okay. Thank you, Mr. Sawyer. That's helpful.

MR. SAWYER: Oh, and, Mr. Chairman, if I may, I don't have any functional role in the balance of the oral hearing, and so I'm not going to be in attendance. And maybe if I could just take this opportunity to -- to thank the Panel and in particular to thank the support staff in the background. They've been very helpful at every step of this process, and so my sort of last words, I wanted to extend my gratitude to them and to the Panel as well. Thank you.

THE CHAIR: Okay. Thank you. It's appreciated, Mr. Sawyer.

So just for clarity, then, you aren't planning to do any cross of the Benga panel on this topic area?

MR. SAWYER: I am not.

THE CHAIR: Okay.

MR. SAWYER: We -- we're -- yes. No, we're not, sir.

THE CHAIR: Okay. Thank you for that clarification. Okay. Thank you, Mr. Sawyer.

MS. OKOYE: Okay. Thank you, Mr. Chair.

Ms. Okoye Cross-examines Benga Mining Limited

Q MS. OKOYE: So, Mr. Houston, we were talking about berms that you will use as your noise mitigation option. I'd like to understand from you if Benga has any plans to repair berms that slumps or that settles once you've put them in place?

A MR. HOUSTON: Mr. Chair, the berms that we'd be talking about would actually be an integral part of the ex-pit dump, and the berm would simply be a part of the dump on the outside perimeter that is put in place earlier than the rest to mitigate noise as we work from east to west in the dump.

Q So if the berms slump or settle as you -- as the trucks are moving back and forth, what are your plans to repair them?

A Mr. Chair, this would be a -- an active construction project, and -- and so we would continue to maintain the entire ex-pit dump area as it's being constructed and -- and even through reclamation.

Q Okay. So in terms of that maintenance, are you able to give us some specifics as to what you would do really?

A So maybe I'm not being clear, Ms. Okoye, but we -- we would physically construct the -- the edges of the dump earlier than the interior of the dump to -- to create that temporary sound barrier, but it would be a part of the ex-pit dump.

Q Yeah, I understand that. But you are going to be piling -- so the berm itself, is that going to be a rock pile or something else?

A Yes, that will be the same material that we use and are storing in the rest of the dump.

Q So more rocks than anything else, not sand or anything

else?
A No, no, no. It's the same material we're -- we're using to construct the entire ex-pit dump.
Q So any slumping that occurs as you are piling the rocks, are you going to take active steps to repair them or put them in place? Is that --
A Yes.
Q -- what I hear from you?
A Yes.
Q Okay. So in terms of your commitment -- and I think you mentioned that also in your opening statement. In CIAR 571, PDF 15, Benga states that: (as read)

> Benga further commits to conduct follow-up noise monitoring studies similar to those conducted for the purposes of Consultant Report Number 1 [I believe that should be "Number 2"] within the fist year after start of operations and thereafter on a five-year interval.

So I'd like to understand what your commitment -- what you are really committing to. Are you committing to do a comprehensive sound survey in the first year of operations and also within five-year intervals, as well as also do a noise impact assessment?
A We -- we would do a -- a survey, Mr. Chair, on those intervals first year and then every five years to

assess whether the noise emissions from the project are within the bounds of what we've modelled. As per Directive 38, we would also have to do an assessment on a complaint basis if -- if there was an issue.

Q So you wouldn't do a noise impact assessment at the same time or within a specific interval between when you do your comprehensive sound survey and the noise impact assessment? So what I'm trying to get at is: Within the first two years of operation, you will do your noise impact assessment, and you will do also the comprehensive sound survey, which I understand to be just a noise monitoring of a specific time period to determine what the noise levels are within that time period. So is that what you're going to be doing? You will do the noise monitoring survey, you will also do your noise impact assessment within the first two years of operations, and then you repeat that again within five years or whenever the mine plan changes? Is that the same -- do we have the same understanding?

A So we would do a -- a noise survey during the first year of operations and -- and every five years after that. To the extent that parameters such as the number of equipment or the mine plan have changed significantly from the impact assessment that Mr. Bilawchuk has -- has done, we -- we would redo that -- that impact assessment.

Q So when your mine plan changes, are you also going to be redoing the noise impact assessment as well as the comprehensive noise survey?
A I -- I wouldn't think with every change, Mr. Chair, but if there were a significant change in plans or a significant change in the types of equipment that we're going to use that we -- we could do that if -- if it seemed we were moving in that direction.
Q So you're just going to be -- if I understand what you're saying, your noise impact assessment, you will only do that if there is a change in equipment or if there's a change in the predicted noise levels, is that correct, based on your sound monitoring or sound survey?
A So -- so, to be clear, we -- we will do a sound survey in the first year of operations. We'll look to see that the -- the noise levels are matching with our impact assessment, and -- and if we are inside that envelope, there's no need to do a -- an additional impact assessment at that point. If -- if the mine plan changed significantly from what we filed, we would take a look to see whether a -- a new impact assessment was -- is warranted based on that changed mine plan, which would be a -- a look ahead. So primarily we would be doing the noise surveys in Year 1 and Year 5 to assess whether the actual noise levels from the

project are -- are similar to the ones that we have predicted.

Q Okay. And so if there is a difference, then you will do the noise impact assessment?

A If there's a difference on -- on the -- the wrong side, on the -- on the noisier side, then we would look at additional mitigations that we could put in place to bring us back within the envelope that we've talked about.

Q Okay. So that additional mitigation, will that include doing a noise impact assessment to assess, really, the mitigations that you're going to be putting in place?

A Yeah. I think -- I think that would be a -- a normal thing to do. If -- if -- if we determined that the project was noisier than we have predicted, we would put in place mitigations, then reassess. I think that would be a -- a normal step.

Q Okay. Just a few minutes to run through my questions and see if I missed anything.

MS. OKOYE: Okay. Mr. Chair, thank you, Panel. Those are my questions for the Benga panel.

Thank you, panel.

THE CHAIR: And so that concludes the Coalition's cross, just for clarity, Ms. Okoye?

Oh, sorry. You're on mute.

MS. OKOYE: Yes, that concludes our cross.

Thank you.

THE CHAIR: Okay. Thank you.

Next up will be the Livingstone Landowners Group.

MR. FITCH: Good morning, Mr. Chair. Can everyone hear me?

THE CHAIR: I can hear you.

MR. FITCH: Great.

Mr. Fitch Cross-examines Benga Mining Limited

Q MR. FITCH: Good morning, Benga panel. My name's Gavin Fitch, counsel for the Livingstone Landowners Group.

I'm going to have a number of questions focused primarily on dust and wind to begin with and then health, so you wildlife types and the noise expert can relax because I have no questions for you.

So to begin, Mr. Rudolph, do I understand correctly that you led the air quality assessment work on this project?

A MR. RUDOLPH: I did. That's correct.

Q Okay. You were a little faint there, sir.

A Sorry. Yes, I did, Mr. Fitch.

Q Okay. And so you prepared or oversaw the preparation of Consultant Report Number 1 on air quality?

A I did, yes.

Q Okay. So now at some point, you left Millennium, and you went to AECOM; correct?

A That's right.
Q Yeah. So after you left Millennium, did you remain involved in Grassy Mountain by, for example, drafting responses to information requests on air quality issues?
A I did. I think most of the information requests were prepared while I was still at Millennium.
Q Okay. And when did you leave?
A In January of this year, so ten months ago.
Q Okay. Okay.

So you can speak to, really, all of the materials, then? There's no issue -- there's no gap, so to speak?

A No, there's not.
Q Okay. Good.

Sir, I take it you would agree with me, or Mr. Houston, that fugitive dust emissions from mining operations are one of the main emission sources for this project?

A Yes. It is a large emission source, yes.
Q And I think you say in various places in your reports that dust emissions from wheel entrainment is a major source of fugitive emissions?
A Generally speaking in mining operations, yes, fugitive dust from -- road dust is the largest source, typically.
Q Okay. And specifically with respect to this project,

not just generally; correct?
A That's correct.
Q Okay. Do you agree that wind plays an important role in determining air quality?
THE COURT REPORTER: Sorry, Mr. Fitch. There was a little bit of a sound. Can you start that again, please?
MR. FITCH: Sure. I think Mr. Rudolph put on a headset.
A MR. RUDOLPH: I did.
Q MR. FITCH: I can hear you much better now sir.
A Yeah. Sorry about that.
Q No, that's okay.
So do you agree that wind plays an important role in determining air quality?
A It does, yes.
Q Okay. And as I understood reading through the air quality assessment materials, when we're talking about "windblown dust", that refers to dust blowing from surfaces, like, at a fairly simple level; is that right?
A That's correct, yeah.
Q Okay. And do I understand it correctly that when you're modelling windblown dust from surfaces, you need to know the area of the surface from which the dust is

blowing?
A That's right.
Q Okay. And, in fact, that's an input into the modelling that you do; correct?
A It is, yeah.
Q Yeah. Okay. I think it's probably already on the record, but just so that it's clear, you assessed emissions in Year 19 of operations?
A Yes, we did.
Q And you did that because it was assessed to be a reasonable worst-case scenario for air quality?
A That's right.
Q Okay.
MR. FITCH: So, Zoom Host, can we call up Registry Document 42, so the environmental impact assessment, Section E, PDF 24.
So if we can focus on the table at the bottom of the page, please. That's good. Thanks. Yeah. There we go.
Q MR. FITCH: So this is Table E.1.3-1, which is titled "Project Construction and Operation Emissions in Year 19"; correct, sir?
A MR. RUDOLPH: That's what the table says, yes.
Q Okay. And that's what it is; right? That's where you set forward -- you set forth the predicted levels of

emissions of various contaminants of concern; correct?
A I believe so. I mean, the -- the emissions that we would have used for modelling are detailed in the Consultant's Report Number 1, but this appears to be a summary of that information, yes.
Q Okay. And I just was interested in the note at the bottom, note A, that says: (as read)

> Wind-driven emissions are not included in the table.

A That's --
Q Do you see that?
A That's -- that's correct. Those emissions --
Q Okay.
A -- would be -- again, the emissions are detailed in Consultant Report Number 1.
Q Okay. But you've agreed wind-driven emissions are not included in the table that we're looking at; correct?
A That is correct.
Q Okay.

MR. FITCH: So now let's go to Consultant Report Number 1, so also CIAR 42, and this is 1A -- Report 1A, at PDF 45. So now we're looking at Table 4.2.7. If we can just -- yeah, there we go. That's great. Thank you.

Q MR. FITCH: So, now, this is a table that sets forth wind-driven emissions on what is described

as "the windiest day in five years of meteorological data"; correct?

A MR. RUDOLPH: Yes, I see that.

Q And what I -- what I am just trying to understand is: How does one relate the predicted emissions in this table to what we saw in the last table, which, as we discussed, did not include wind-driven emissions? Are you able to just clarify that for us?

A These -- these emissions would be in addition to the emissions included elsewhere.

Q Okay. Fair enough.

So, sir, when I did a document search through your Consultant Report Number 1, air quality, and I looked for the word "Chinook" in proximity to the word "wind", I got no hits. Does that surprise you?

A It doesn't surprise me, no.

Q No. There is no mention of Chinook winds anywhere in your air quality assessment, are there?

A There -- there may not be, no.

Q Okay. Okay. So if we can go to PDF page 37 in this same document. So we're still in the Consultant Report Number 1.

So we've touched briefly on the fact that to model wind-driven dust emissions, you need to -- you need to know what size area are going to be -- is going to be generating those emissions. So I've called up this

page because my understanding is these -- this is a -- sort of narrative summary of the areas that were assessed when you looked at wind-driven dust emissions. Is that basically correct?

A These are the areas in which sources were located for the purpose of the -- the various activities. We've -- we've done a separate estimate of the areas that are routinely disturbed or disturbed every hour, which would go into the -- into the windblown dust calculation, and we've determined that that number is 35 kilometres as a -- probably a worst case.

Q You mean --

A Sorry. 35 hectares.

Q Right. Okay. 35 hectares.

MR. FITCH: Could we, Zoom Host, go to the next page, please.

Q MR. FITCH: Okay. So here in Table 4.2-1, you list "project emission sources". And would I understand correctly that the top part of the table that describes mining areas and those areas where drilling occurs or waste stripping occurs or bulldozing and loading of coal, et cetera, and haul roads, all -- those are all areas that give rise to wind-driven dust emissions; correct?

A MR. RUDOLPH: They would, yes, in general.

Q Okay. And when I -- when I added up those numbers in

that first block, the "mining area block", if I can call it that, I got to about 161 hectares. Does that seem right to you?

A Approximately, yeah.

Q Okay. The other areas listed on that table, the plant and the reclamation area, are those areas that would have been factored into your wind-driven dust emission modelling?

A I would have to check to see exactly which ones of those would be. For example, not all of the -- the storage piles would have -- you know, would be disturbed on a continuous basis. Not all of the reclamation area, and not all of the waste disposal area. Those would be areas in which some activity would occur at some time.

Q Okay.

A Our --

Q So was --

A Our -- our calculation, though, was that 35 hectares would be disturbed on a more or less continuous basis. So some portion of the coal haul roads, some portion of the area at which loading, unloading, bulldozing of the -- the coal seam, for example, would -- would occur.

MR. FITCH: Okay. Zoom Host, could we go to PDF 43, please, in the same document. So, yeah, I'd

like to look at Table 4.2-4, so the lower of those two tables. That's good. Thanks.

Q MR. FITCH: So here we see a table which appears to set out the maximum hourly and daily fugitive dust emissions from project activities; correct?

A MR. RUDOLPH: That's correct.

Q Okay. And so I think what I'm hearing from you is the area -- the size of the area that you looked at when you came up with those numbers that are listed in that table is not 161 hectares; it's 35 hectares. Did I get that right?

A No. These -- these are numbers that are, again, independent of the windblown dust. These are the activities that generate other -- other sorts of dust. And that would be not on an area basis, but on the activities that are occurring in those -- in those areas.

Q Okay. So this table does not apply to windblown dust? Is that what --

A These --

Q -- I'm to understand?

A That's correct. These are emissions that are independent of windblown dust.

Q Okay.

A And it would be essentially occurring at -- at -- at

all hours.
Q Okay. That's fine.
MR. FITCH: So, Zoom Host, can we go to PDF page 193 in the same document? So if we can go down the page. That's good. Okay.
Q MR. FITCH: So I'm interested in that last paragraph. And I note that the first sentence states that: (as read)

> The total modelled mining and stripping area is 121 hectares.

Do you see that?
A MR. RUDOLPH: I do.
Q And I'm just wondering -- what we looked at before, it seemed to indicate that the mining and stripping area was 161 hectares. So I'm just wondering why the difference in those two numbers?
A I can't tell you offhand. I'd have to -- have to check.
Q Okay. So then the second sentence in that paragraph, it says: (as read)

> About 10 percent of the total area is assumed to be active for wind-driven emission calculations.

A Right.
Q So that would be 12.1 hectares; correct?
A Approximately, yes.

Q Yeah. So what is the basis for the assumption that only 10 percent of the total mining and stripping area of 121 hectares is active for wind-driven emission calculations?
A The -- I think what we've done for the purposes of modelling is placed an area source, essentially, on the map and -- within which there could be emissions from these activities. So it would have -- or could potentially be with -- within the year of operation. So with -- you know, whenever, though, the activity is occurring, it's going to be occurring in a much smaller portion of that. You know, roughly that would be associated with the actual month of -- of operation. So we've used 10 percent to approximate that -- the activity that's happening at, you know, any -- any given day.
Q But how did you arrive at 10 percent? Why not 15 percent or 5 percent or 20 percent? Where did that number come from?
A It's -- it's an estimate, I think, based on experience in other areas. And, again, as I said, it's a -- if we have activity occurring in a year, and, you know, we're looking at one-twelfth of that year as an approximation, 10 percent is roughly what that area would be.
Q Did Benga give you that number or did you --

A No. This was an estimate that we would've arrived at independently of Benga.
Q Okay.
A But based on our experience with what -- what area would actually be actively working in the -- in the pit.
Q And you're telling me that 10 percent, at least partially -- let me start over again.

Part of the rationale for that is that in a month, you'd only be looking at, you know, a small portion of the area that would be actively mined in a year. Do I have that right?

A Roughly, yes. At any -- at any one time, we would be looking at a much smaller area of operation than the 120 -- or 120 hectares, yes.
Q Okay. And then the next sentence says that: (as read)

The total unpaved hauling road is 60 hectares, and 30 percent of the area is assumed to be actively disturbed.

Do you see that?
A I do.
Q Okay. So, again, what's the basis for the assumption that only 30 percent of the unpaved hauling road is assume -- is actively disturbed?
A Well, we're -- we've -- we've -- I think we've assumed that the -- that only a portion of the width of the

haul road is actually used at any one time, that the entire area of the road is not actively disturbed.

Q Okay. Anything else?

A No.

Q Okay. So 30 percent of 60 hectares would be 18 hectares; right?

A Approximately, yeah.

Q Yeah. Okay.

Then in the next sentence, you talk about the stockpile areas that you say are 4.5 hectares each, 100 percent of the surface area of each actively disturbed; correct?

A Yeah, I see that, and that's actually a typo. Our -- our assessment, it was based on 50 percent of the surface area, not the entire -- the entire area.

Q Okay. I'm sure you can do the math. Because if you actually took --

A Correct.

Q -- 12.1 hectares and 18 hectares and 9 hectares, you'd get 39 hectares, not 35; correct?

A That's right.

Q Okay. So it's not 100 percent; that's an error? It's 50 percent?

A The 35 --

Q Do I have that right?

A The 35 hectares is what was used.

Q And the basis is that, in fact, it's -- you would assume 50 percent of the surface area of the stockpiles are actively disturbed; isn't that what you're -- what you just said?
A That's correct.
Q Okay.
MR. FITCH: So if we can go to the next page, please, Zoom Host.
Q MR. FITCH: So here is a Table A4-4 that sets forth maximum wind-driven daily emissions on the windiest day in five years of meteorological data; correct?
A MR. RUDOLPH: That's right.
Q And I see that we see there in the right-hand column the total of 35 hectares. And that's the number that you say you used; correct?
A And the contribution, yes, from each of those areas.
Q Right. But I see that it includes 2 hectares for reclamation area, which didn't seem to be referred to on the preceding page. Do you recall that?
A That's right.
Q Yeah. So, you know, I guess I'm having trouble following your math. Is it 39? Is it 35? Or should we deduct the 2 for the reclamation area? Is it 33? I mean, what's the right number, sir, and how did you arrive at it?

A I think our -- the -- the emissions that were used in the calculation were based on 35 hectares, and there -- in the -- in the right-hand column. And I -- I'm not sure if we discussed the contribution of the reclamation areas in the table -- or in the discussion above or not. I don't see it on this table.

Q Well, I mean, if you -- if you took -- if you took 10 percent of 121 hectares and got 12.1 hectares, and you add 2 for the reclamation area, 18 for the unpaved haul road, 12.7 for the coal pile, you end up with a different number. You end up with, I think, about 37. It seems very unclear from your materials, sir, how you actually arrived at 35 hectares. Do you understand my confusion?

A I -- I do. I think this table lays it out quite accurately, with the exception that the "35 hectares" refers to the -- to the mining area or to the active area as opposed to the reclamation area.

Q Okay. So that's another error? The "Reclamation Area" column should not have been included?

A As part of the 35 hectares, that's correct.

Q Okay. And so just returning briefly to your -- our discussion about the assumption that only 30 percent of the haul roads will be actively disturbed -- and I think you said it's because not the entire width of the road would be taken up; is that right?

A Right.
Q Okay. You do, of course, acknowledge that trucks will be going both ways --
A I --
Q -- won't they?
A I -- I -- I do.
Q Okay. But you're saying that as -- I guess I'm just -- I'm struggling. So are you saying that 70 percent of the haul roads will not be actively disturbed notwithstanding that there's two-way traffic on them?
A Well, our assumption was that about 10 to 15 metres of the haul road would be used up at any one time; that's right.
Q Right. And I guess my question is: How does that accord with the fact that you're going to have two-way traffic on the haul roads, which, I mean, I think we can probably agree means more than 30 percent of the width of the road is going to be used?
A There are -- there are -- there will be times, certainly, when they're passing and a greater width would be used, but we're -- our assumption was that 30 percent of the haul road would be disturbed at any one time.
Q Okay.
MR. FITCH: Zoom Host, can we go to Section C of the EIA, so Document 42, Section C,

PDF 212?

Sorry. Can we go up the screen? No. Sorry. The other way. Yeah. Okay. This is the right page.

Q MR. FITCH: So, sir, you see I've called up -- or I had the Zoom host call up Figure C.1.3-20 from the "Project Description" part of the EIA. Do you see that?

A MR. RUDOLPH: I see Year 20 as -- on the map, yes.

MR. FITCH: Oh, sorry. Then we need to go one -- to the preceding page, Zoom Host. My apologies. There we go. That's the right one.

Q MR. FITCH: Okay. So this is the annual progression map for Year 19. Would you agree with that?

A MR. RUDOLPH: I do, yes.

Q Okay. And you can see that if we look at the legend at the bottom in the left corner, the active mining area is denoted as corresponding with the colour yellow?

A That's right.

Q Okay.

MR. FITCH: Now, if we can go up the document, and if we can maybe zoom in a little bit, please, on that yellow area. Maybe just one more. All right. Perfect. That's great.

Q MR. FITCH: So can you see, Mr. Rudolph,

the straight horizontal and vertical lines that indicate the boundaries of the land sections?

A MR. RUDOLPH: I can, yes.

Q Yeah. And it might be a little hard to see, but the -- the section that's sort of in the middle, I would say, of that yellow area or maybe the bottom half of that yellow area is Section 36. Do you see that? Do you see the number of "36"?

A I don't on my screen, but I -- I'll take your word for it, sir.

Q Okay. And then the one north of that is Section 1. Will you take my word for that too?

A I will.

Q Okay. Good.

All right. So here's the dilemma: When I look at this map produced by Benga, describing the active mining area in Year 19, I see large swaths of active mining in Sections 36 and Section 1, and then to the west of Section 36, there's a small bit just below the north waste rock dump, and there's also a small bit west -- sorry, east of Section 1, and, I mean, just eyeballing it, it looks to me easily that there's more than an entire section of land denoted as being an active mining area. Would you agree with that lengthy question?

A If your -- if your math is correct, I think that's --

that's reasonable. So that's -- that's the entire year's worth of disturbed area.

Q Right. But you'd agree with me that a section of land is 640 acres or 259 hectares?

A Again, I'll take your word for that.

Q Okay. So it seems to me, sir, looking at this map, that we have, through the -- through Year 19, between 250 and 300 hectares of active mining area. So my question for you is: When you made your assumptions for your wind-driven dust modelling, did you -- were you aware of this map? Did you have reference to it?

A We did, and, in fact, we used it to establish where our sources would be placed for the -- for the assessment. So, again, you know, yes, you're -- you're right; we have something like upwards of 300 hectares of disturbance in a year. But the disturbance at any one time is obviously much less than that, and if we divide it by 12 to get down to a month, you know, we're looking at 30 hectares or so, you know, approximately speaking at least. And then if we look at what's happening on any given day, the area's obviously much less than that as well. So I don't think our estimates of active area at any one time for modelling purposes are -- are too, too far out.

Q Well, sir, you've now told me something different than what you told me before. In your Appendix A to your

air quality assessment, you say that the -- the active mining area in Year 19 is 121 hectares, but you assumed that only 10 percent would be active based on that roughly corresponding to a month. That's what you told me; correct?

A I did.

Q Yeah. And so the result of that was that the number you used in your modelling was roughly 12 hectares; correct?

A Correct.

Q Okay. So now we're learning that, in fact, through Year 19, there would be approximately or up to 300 hectares of active mining area, and 10 percent of that is 30 hectares, not 12; right?

A Well, 10 percent of -- of that is the -- is the -- 10 percent of 120 is 12, yes, but to get to 120, it's -- it's not a -- you know, we're still looking at the approximate area that's disturbed in a year and then what is actually happening on any given time that we're -- that we're modelling.

Q Sir, when we look at the map that's up on the screen, where's the 121 acres out of that 300 or so that's listed as being active?

A It -- it would be an approximation, and -- and we can point to our -- and we can point to our dispersion modelling appendix in CR 1 to identify where those

sources were placed that add up to the areas that we've identified.

Q Well, that's what we just looked at, isn't it?

A This -- this is the mine plan. It's -- you know, our sources are obviously in a different location, depending on what stage of the year that we're -- that we're modelling, or that we're -- that we're -- that are actually active at the time of modelling. And, again, you know, the -- the -- the estimation is approximate. But I don't think that anyone -- at any given time that that area is -- is unusually -- or would be anything like the 350 hectares that you've indicated it is. It's much closer to the numbers that we've used in modelling, again, based on what's happening at the -- you know, we're -- we're modelling a day's worth of operations, essentially, based on the -- the year of operation that we've chosen here, Year 19, and the actual area that's disturbed on an ongoing basis during that time is -- is much less than is shown on this map in yellow.

Q Sir, how did you get from 300 hectares to 121?

A I would have to go back to my notes for that, but ...

Q You don't know?

A I've given -- I've given you the -- the -- the approach that we've used to find that. No. Do I -- do I know what was -- or, you know, precisely how -- what was

done at the -- you know, in 2015 when this was done? I -- I -- I don't. I can give you the approximate numbers that we arrived at and the process by which we made those estimations at the time.

Q Okay. And staying on the figure we're looking at. Excuse me. You would agree with me that the brown lines are haul roads?

A I'll take your word for it.

Q Do you --

A I don't see -- I don't see it on the map, but I'll take your word for it, yes.

Q Well, why don't we zoom -- would it be in or out? I think out. Just make the image smaller. Maybe that's an easier way to put it.

A I see the haul road --

Q Yeah. So there you see --

A I -- I see --

Q Yeah.

A -- the haul roads on there, yes.

Q Okay. So you'd agree with me that in Year 19, the mining is up in the north end of the pit; correct?

A That's right.

Q And so the trucks are driving from, basically, the north end of the project area, all the way down to the coal-handling processing plant, dumping their load, and then going back up again, aren't they?

A They are. And they're also going to -- to waste disposal areas as well.
Q Okay.
MR. FITCH: If we could go, Zoom Host, back to Consultant Report 1A, the air quality assessment.
A MR. RUDOLPH: And, Mr. Fitch, just as I -- sorry. As I look at that table, by -- my quick math does tell me that that adds up to 35, so I don't --
Q MR. FITCH: Well, it does with 2 hectares --
A With -- with --
Q -- for reclamation?
A With the addition of the reclamation, yes. Thank you.
Q Right. So if you take the reclamation area out, it's actually 33, isn't it?
A It is. With the reclamation area in, it's 35, which is what was modelled.
Q Yeah. But you didn't model the reclamation area, did you?
A We modelled the reclamation area, yes.
Q Oh, it was modelled. Okay.
A Yeah.
Q All right.
A And, again, these -- these -- the areas that we've used for modelling are shown. If -- if you choose to go

there, they're in Appendix A to CR Number 1.
Q Well, that's what we're looking at. This is Appendix A to CR Number 1. Is there a different Appendix A --
A There is --
Q -- to CR Number 1?
A No. You've got the -- the table, but if you -- sorry. If you wish to see a map of where things are, we can definitely show you a map, and that shows that the reclamation area is on that map as a modelled area.
Q Why don't we look at the map? Tell me, where is the map, sir? You can take a moment, if you want.
A Yeah. I'll need to.
A MR. BARTLETT: PDF page 178, I believe.
A MR. RUDOLPH: It's -- it's -- there you go. Yeah. That's it.
Q MR. FITCH: So for the purpose of your wind-driven dust emissions modelling, the areas included in the model are the green boxes; is that correct?
A Well, these -- it -- it does include all -- no. These are all areas -- all sources that were modelled. And as we discussed, not all of -- all of these areas were -- were modelled, but it -- it also shows --
Q Okay. So, in fact --
A But it -- but it --
Q There's no --

A But it --
Q Sorry. Go ahead.
A No. I'm -- I was going to say: It shows the areas that were modelled for all active sources, the -- shows you where the -- you know, the -- the modelled haul roads were, not where all haul roads would be located during the -- during the year, and it shows you where, for example, the -- the stockpiles are located, and, as that table indicated, some -- some fraction of those areas were actually considered to be actively disturbed on an ongoing basis.
Q Okay. So let me see if I can unpack that. So for the purpose of the modelling for the wind-driven dust emissions, not all of these green boxes were included, or were they?
A Not all of -- all of them. But it does show you where the reclamation area is, and we discussed -- or the -- the table indicated what fraction of that area would be actually -- actively disturbed on a daily basis.
Q Is there a map anywhere, sir, that shows the location of the 35 hectares?
A There -- there's not, to my knowledge, no.
Q Okay.
MR. FITCH: Mr. Chair, it's 12:10. I was going to move to a slightly different line of questioning, so maybe this would be a good time for our

lunch break.

THE CHAIR: Yeah. I would agree, Mr. Fitch.

So it's, yeah, about ten after 12, so let's resume at 1 PM.

MR. FITCH: Thank you.

PROCEEDINGS ADJOURNED UNTIL 1:00 PM

Proceedings Taken via Remote Video

November 26, 2020 Afternoon Session

A. Bolton	The Chair
D. O'Gorman	Hearing Commissioner
H. Matthews	Hearing Commissioner
M. LaCasse	AER Counsel
B. Kapel Holden	AER Counsel
K. Lambrecht, QC	Joint Review Panel Secretariat Counsel
T. Utting	IAAC Staff
E. Arruda	AER Staff
D. Campbell	AER Staff
T. Turner	AER Staff
T. Wheaton	AER Staff
A. Shukalkina	AER Staff
M. Ignasiak C. Brinker	For Benga Mining Limited
R. Warden T. Howard	For Ktunaxa Nation

K. Poitras	For Métis Nation of Alberta Region 3
Chief B. Cote	For Shuswap Indian Band
B. Snow	For Stoney Nakoda Nations
R. Drummond S. McHugh	For Government of Canada
A. Gulamhusein	For Municipality of Crowsnest Pass
M. Niven, QC R. Barata J. Nijjer (Student-at-Law)	For MD of Ranchland No. 66
B. McGillivray	For Town of Pincher Creek
D. Yewchuk	For Canadian Parks and Wilderness Society, Southern Alberta Chapter
R. Secord I. Okoye	For Coalition of Alberta Wilderness Association, Grassy Mountain Group, Berdina Farms

		Ltd., Donkersgoed Feeder Limited, Sun Cured Alfalfa Cubes Inc., and Vern Emard
	R. Cooke	For Crowsnest Conservation Society
	G. Fitch, QC C. Agudelo	For Livingstone Landowners Group
	M. Sawyer	For Timberwolf Wilderness Society and Mike Judd
	(No Counsel)	For Barbara Janusz
	(No Counsel)	For Jim Rennie
	S. Elmeligi A. Morehouse S. Milligan M. Boyce	For Alberta Chapter of the Wildlife Society and the Canadian Section of the Wilderness Society
	J. Gourlay-Vallance	For Eco-Elders for Climate Action
	L. Peterson	For Trout Unlimited Canada

R. Campbell	For Coal Association of Canada
(No Counsel)	For Alistair Des Moulins
(No Counsel)	For David McIntyre
(No Counsel)	For Fred Bradley
(No Counsel)	For Gail Des Moulins
(No Counsel)	For Ken Allred
(Not Present)	
(No Counsel)	For Monica Field
S. Frank	For Oldman Watershed Council
A. Hurly	
C. Longacre, RPR, CSR(A)	Official Court Reporter

(PROCEEDINGS COMMENCED AT 1:04 PM)

Discussion

THE CHAIR: Welcome back, everyone.

Just before we get started again with Mr. Fitch's cross-examination, just one matter to deal with from this morning, and it's with respect to Mr. Sawyer's

request to file an updated report for Dr. Norman. The Panel has considered the request, and while it is common for expert witnesses to correct minor errors in the written submissions during oral testimony, they're generally of a -- of a minor or a clerical nature. It's not common for experts to be permitted to file revised versions of their written submissions and, particularly, if they require -- if they involve a more substantive change, and in this instance there was no undertaking request to provide an update. So for this reason, we agree that it's not necessary or appropriate for this to be filed, and so it will not be marked as an exhibit.

Any other matters before Mr. Fitch continues?

MS. OKOYE: Yes, Mr. Chair. I do have two matters -- two items to bring up. The first one is in relation to the aid to cross that I had referenced, but I didn't get that marked or entered as an exhibit. And that is AQ Number 3, Coal Valley Resources -- sorry, Coal Valley Robb Trend Consultant Report Number 8 noise impact assessment, so I'd like to get that marked as an exhibit.

THE CHAIR: Okay. Mr. Ignasiak or Mr. Brinker, any concerns?

MR. IGNASIAK: No, sir.

THE CHAIR: Okay. Can we get a number for

that?
MS. UTTING: Mr. Chair, that would be CIAR 910.
THE CHAIR: Okay.
MS. OKOYE: Thank you.
EXHIBIT CIAR 910 - AQ#3 - COALITION - COAL VALLEY RESOURCES 31_CR_8-NOISE_REDACTED - AIR AND WILDLIFE TOPICS
MS. OKOYE: And the other item I just wanted to confirm from the Panel is whether we are sticking to the schedule, so -- in which case, my witnesses will be coming up on Monday to give their intervener evidence, or is there an intention to maybe shrink the schedule and bring them up on Friday? Our preference would be to go in Monday.
THE CHAIR: Okay. For now, I think we're still sticking with Monday. Things are moving a bit quicker than we expected in terms of people's cross, so we'll see what Mr. Fitch has for us, and we'll probably know better at the end of today, but at this point, it still looks like Monday for your witnesses.
MS. OKOYE: Okay. Thank you.
THE CHAIR: Okay. Any other matters?
Okay. Mr. Fitch, you can continue.
MR. FITCH: Thank you, Mr. Chair.
GARY HOUSTON, MIKE BARTLETT, RANDY RUDOLPH, JANET

BAUMAN, DANE MCCOY, Previously Affirmed
STEVE BILAWCHUK, IAN MITCHELL, JOHN KANSAS, LINDSEY MOONEY, Previously Affirmed
(Dust, air quality, greenhouse gas emissions, noise, and light; wildlife, including migratory birds and species at risk, wildlife health, and human health risk assessment)

Mr. Fitch Cross-examines Benga Mining Limited

Q MR. FITCH: So back to you, Mr. Rudolph. I have one follow-up question from our discussion this morning about the 35 hectares that was used as an input in your wind-driven dust emission modelling. And my question is: Is the 35 hectares intended to represent a worst-case scenario? In other words, could there be a larger area actively disturbed at any time, or do you know?

A MR. RUDOLPH: The 35 hectares was our estimate of what would be disturbed on a -- a typical -- a reasonably worst-case day. I think that's correct, yes.

Q Thank you.

MR. FITCH: All right. If we can turn up again Consultant Report Number 1A, the air quality assessment, and go to PDF page 45.

That's not the right page I'm looking for, so I must have the wrong reference.

A MR. RUDOLPH: I think we're looking for CR Number 1. Yes. Thank you.

Q MR. FITCH: Yes, we are. Yeah. Oh, we were on the wrong document. Okay. Great.

So, Mr. Rudolph, I see there in the first paragraph, the AQA -- if I can call it that -- states that: (as read)

> For wind-driven emissions from active areas of operation, the emission factor formula was obtained from Environment Canada Pits and Quarries Guidance.

And then there's a reference given, EC 2009. Do you see that?

A I do.

Q Okay. And then it goes on to talk about Table 4.2-7, which sets out a summary of wind-driven emissions on the windiest day in five years of meteorological data. And I'm interested in the sense that says the worst windy day, essentially, is one in which there are 24 hours of winds above 5.36 metres per second. Do you see that?

A Yes.

Q What is 5.36 metres per second in kilometres per hour?

A It's roughly 20 kilometres an hour.

Q It's 19.3, isn't it?

A That -- that sounds right.

Q Yeah. Not a particularly windy day, certainly not by the standards of Crowsnest Pass; correct?
A But -- well, these -- these are the -- these are the numbers from the windiest day in our meteorological model output; that's right.
Q Okay.
A So this -- this would apply to a day that has -- you're right -- 24 hours of winds above roughly 20 kilometres an hour.
Q Okay.
MR. FITCH: So let's, Zoom Host, go to PDF page 193. And we can just stay where we are, Zoom Host. That's great.
Q MR. FITCH: So, Mr. Rudolph, here again we see that the emission factor formula used in your modelling was obtained from Environment Canada Pits and Quarries Guidance, and the reference is "EC 2009"; correct?
A MR. RUDOLPH: That's right.
Q Okay.
MR. FITCH: Zoom Host, can we pull up Aid to Cross AQ4, please?
Q MR. FITCH: Mr. Rudolph, the document that's been marked as Aid to Cross AQ4 is on the screen. It seems to be a Government of Canada publication titled "Pits And Quarries Reporting Guide".

Now, my question for you is: Is this the document you referred to in your AQA?

A MR. RUDOLPH: Yes, it is.

Q Okay. So Dr. Young, the meteorological expert retained by the LLG and -- as well as myself, we tried to find that emission factor formula in the document that's now on the screen, and we could not. Can you enlighten us a little bit?

A Give me a moment.

Mr. Fitch, I think if you -- I don't know where it is in the version that you've provided, but in the online version, there is a link to a -- an -- an area of the same spreadsheet that provides two methods for calculating the -- the windblown emissions. And there's a Method A and a Method B. And Method A is the one that was used in this document.

Q In your AQA?

A That's right.

Q All right. So you're saying the equation is not -- or, sorry, the formula is not actually in this document; you have to click on a link and go to another document; is that right?

A That's right.

Q All right.

MR. FITCH: Zoom Host, can we go to PDF page 4 of this document, please?

Q MR. FITCH: And if you look at it for a moment, Mr. Rudolph, you might notice that the word "pit" is described as being: (as read)

> An excavation that is open to the air and that is operated for the purpose of extracting sand, clay, marl, earth, shale, gravel, stone, or other rock but not coal.

Do you see that?

A MR. RUDOLPH: I do see that.

Q Okay. And then similarly, if you take a moment to look at the word "quarry" and how its defined, it's similarly defined as excluding coal; correct?

A I see that. And this -- and this document --

Q Did you know --

A This -- this --

Q Go ahead.

A This document is for the purposes of reporting to NPRI. But the formulas within it are much more general than that. And, in fact, they reference formulas developed by the USEPA specifically on coal-mining operations. So the formulas that are underlying this reporting document are much more general than -- than the -- than the reporting requirement itself.

Q You're referring to the USEPA AP-42 document, are you?

A That's -- that's one of them, yes. There are -- there are other -- other sources of information that go into

estimating emissions for the various activities included in this document.

Q All right.

MR. FITCH: Zoom Host, if we can go back, then, to the previous document, which is Consultant Report Number 1. We should still be at PDF page 193.

Q MR. FITCH: So when I look at the formula --

MR. FITCH: And maybe we can zoom in a little bit, please, Zoom Host. That's great. Thank you.

Q MR. FITCH: I'm sure you would agree with me that wind speed itself is not an input into the formula, is it?

A MR. RUDOLPH: That's right.

Q Rather, the letter 'F' is used to stand for the percentage of time that unobstructed wind speed exceeds 5.63 metres per second; right?

A That's right.

Q And the formula assumes that the wind speed of 5.36 metres per second is at a height of 10 metres. Do you agree with that?

A The actual USEPA guidance is that that height is at 15 centimetres, but the -- the -- the -- the guidance here is for a height of 10 metres; that's right.

Q Okay. And I understand that the significance of that

wind speed of 5.36 metres per second is that it is the speed at which TSP-size particles begin to move by wind action?

A I think that's right, yes.

Q Okay. Would you agree that it follows that finer particles, for example, PM 2.5 or smaller, will be more or most affected by wind speed because they're smaller and they are more easily moved by wind?

A Again, I think if you look at the -- the following paragraph where -- where we talk about, you know, the wind -- the wind thresholds are dependent on a number of different things -- particle size is going to be one of them -- the information in AP-42 refers to particles that are -- that are TSP and smaller.

Q Okay. So I think you agreed with me that, yes, smaller particles will be more easily moved by wind than larger ones; correct?

A I did, with the caveat, again, that the -- the USEPA specifies the -- the 5-metre-per-second threshold at -- you know, just above the surface at 15 centimetres is what -- is where their measurements are based on.

Q You, in one of the SIR responses, told the JRP that, as you use the formula, you assumed that the wind speed of 5.36 metres per second was at a height of 10 metres; correct?

A That -- that's how it was used, yes. And we assumed

that that speed was applied to all particles TSP and smaller.

Q Is it fair to say, sir, that in the formula, as you applied it, all wind speeds above 5.36 metres per second are lumped into one category?

A They are.

Q So when you talk in the AQA about the worst windy day, you're not talking about a day when the wind might actually be blowing at, say, 100 kilometres per hour, but, rather, one that has been modelled so that for 24 hours winds are greater than 19.3 kilometres per hour?

A That's right. And it doesn't -- it doesn't -- according to this methodology, it doesn't matter precisely what the wind speed is.

Q Yeah. Okay.

MR. FITCH: So, Zoom Host, could we please go now to Registry Document 251, which should be the tenth addendum. And PDF page 19. Start at 19.

Q MR. FITCH: So, Mr. Rudolph, you'll see there the -- there's an information request from the JRP to Benga; correct?

A MR. RUDOLPH: That's right.

Q Below the preamble, the question basically is to provide a quantitative evaluation and assessment of the potential effects of high wind speed on the transport

of dust and particulate matter from the project; right?
A I see that.
Q Okay.
MR. FITCH: So if we can now go down to the next page, please. Perhaps we can zoom in a little bit.
Q MR. FITCH: So I'm interested in the bullets where you summarize Benga's position, and in particular, the second bullet where you say, and I'm quoting now: (as read)

> Windblown emissions were based on wind of 5.36 metres per second at a height of 10 metres. A speed of 5.36 metres per second at the surface corresponds to winds of 11 to 27 metres per second at 10 metres. But the model generated dust when 10-metre winds were 5.36 metres per second, not 11 to 27 metres per second; thus, the frequency of wind-generated dust is overstated in the model.

I take it you prepared that answer, did you, sir?
A MR. RUDOLPH: I did.
Q Okay. So I'm afraid I don't understand why you say that "the frequency of wind-generated dust is overstated". And we've talked about the fact that the model assumes the 5.36 metres per second is at the

height of 10 metres; correct?
A That -- yes, that's what the bullet says.
Q Yeah. So what's the significance of the fact that winds at surface, if they were 5.36 metres per second, would be 11 to 27 metres per second at 10 metres? You didn't model that; right?
A No. I mean, I -- what we're saying is that had we used the actual EPA documentation which says that winds at -- of -- of about 5 metres per second at the surface or at 15 centimetres above the surface -- had that approach been -- been used, then that 5 metres per second at the surface corresponds to a stronger wind at 10 metres than we assumed.
Q Well, I guess --
A So had -- had we -- had we required a wind speed, for example, of 11 metres per second at 10 metres in order for dust to be generated, we -- we -- the frequency of -- of windblown dust would've been reduced.
Q Right. Okay. I get that.

So my issue is: When I read the final clause in that sentence: (as read)

Thus, the frequency of wind-generated dust is overstated in the model,

it suggests to me that you're saying you should have used -- you should have modelled 5.36 metres per second at the surface, but you did not.

A That's -- that's correct. We modelled it as a 10-metre wind. Our intention in doing that was --
Q And you did that because --
A -- was -- was to -- to be -- to -- to provide a conservative assessment.
Q Well, and because that's the standard Environment Canada tower, I -- as you indicate in your answer; right?
A Well, that's the Environment Canada approach, yes.
Q Okay.
A For -- for that --
Q So the standard --
A For that approach.
Q Okay. What you did is what Environment Canada typically expects; correct?
A That's right.
Q Yeah. Okay.
MR. FITCH: Zoom Host, if we can go to the next page, same document, so it should be PDF 21 in Addendum 10.
Q MR. FITCH: Just want to ask you a couple of questions, Mr. Rudolph, about your Table 1.5-1.
A MR. RUDOLPH: Right.
Q And what you say about it --
MR. FITCH: So, again, if we can maybe zoom in one time. That's great. Maybe move it so we

can see all of the text. The right margin is cut off. Yeah. That's it. Thank you.

Q MR. FITCH: Okay. So the table sets out -- or it sets out a comparison, I guess, of wind-driven emissions to project daily emissions; correct?

A MR. RUDOLPH: That's right.

Q And you acknowledge, don't you, below that table that additional emissions do occur at higher wind speeds; right?

A Well, no. What we're saying in there is that the upper row of that table, you know, we have a base emission, which is the -- the lower row of the table, the maximum daily emission from mine operations, and then when there is wind above the threshold, we do get additional emissions.

Q Right. You say that: (as read)

> While additional emissions do occur at higher wind speeds and are accounted for in the model, higher emissions do not necessarily result in higher predicted concentrations.

So I just want to break that sentence down. So in the first clause, you're acknowledging that additional emissions do occur at higher wind speeds; correct?

A They do, but I'm -- what we're suggesting is what -- and what the -- what the -- what's indicated is that

its larger particles can get emitted at higher wind speeds.

And what I -- what I would add here again, I guess, as well, is that -- and we've -- there are -- there are many ways to estimate wind-driven emissions, and we haven't -- we haven't documented all of the emissions that we haven't used. But we -- as I said, there are -- there are two methods that Environment Canada uses or -- or -- or offers for use. The other is the more traditional USEPA approach.

And for the wind -- and we did, obviously, double-check those emissions against this, let's say -- let's call it a simpler emission estimation approach for windblown dust. And they're -- they're very similar on the day with the maximum wind speed used in our model -- the maximum one-hour wind speed used in our model in the mining area.

So this -- this relatively simpler formula results in essentially equivalent emissions -- at least for TSP, which we checked -- to the more traditional USEPA approach.

Q Let me see if you'll agree with this, sir. As wind speed increases, the rate of particulate matter in emissions also increase, but countering that is that increased wind speed also helps dilution or dispersion. Would you agree with that?

A I would certainly agree with the latter part of it. And, again, if you use the traditional USEPA approach, emissions do increase with wind speed. That is correct.

Q Okay. All right. Thank you.

Now, sir, as part of your preparation for this hearing, did you have an opportunity to review the report prepared by Dr. Young for the Livingstone Landowners Group?

A I -- I'm sure I did, yes.

Q Okay. So he tells me that when we're dealing with particles, emissions increase to the third power of wind speed, but the dispersion is increased by the inverse of wind speed. Do you agree with that?

A Do I agree that that's his position?

Q Well, no. I'm asking do you agree with that proposition?

A That's -- that's not the information I've seen. That's not an approach that I've seen used in the standard approaches, such as Environment Canada or the USEPA.

Q Well, I'm not asking you what approach. I'm asking you about a proposition. My impression is this is like a scientific principle. I'm not asking you about approaches taken or not taken by regulators. I'm asking you: Do you agree with that principle, that emissions increase to the third power of wind speed

when we're dealing with particles, but dispersion is increased by the inverse of wind speed? Or do you just not know?

A I have seen papers wherein that is the case. However --

Q Thank you.

A However, that is not necessarily the approach that is recommended either by the USEPA or by Environment Canada.

So does -- do -- do other researchers in the area have their -- their approaches to emission estimation? Yes, they do. But those are not the approaches that are recommended for use in an application of this nature. So we're using approaches that are recommended -- modelling approaches that are recommended for applications in Alberta.

MR. FITCH: Can we just scroll down, just a couple of lines in -- on the same page, please, Zoom Host? That's enough. Thanks.

Q MR. FITCH: So I'm interested now, Mr. Rudolph, in the paragraph where you say that: (as read)

To examine the wind speeds under which the highest TSP concentrations were predicted, Figure 1.5-1 was prepared for predictions on or outside the mine permit boundary above the

TSP AAAQO of 100 micrograms per metre cubed. All exceedances outside the mine pit boundary occurred with 24-hour average wind speeds less than 4 metres per second, and the highest concentrations were associated with lower wind speeds (less than 2 metres per second).

So I think we can agree, sir, that your -- what you're saying is your modelling shows that the highest TSP concentrations are associated with lower wind speeds?

A MR. RUDOLPH: That's right. Averaged over 24 hours; that's correct.

Q Okay.

MR. FITCH: Zoom Host, can we pull up Aid to Cross AQ2, please?

Q MR. FITCH: So, Mr. Rudolph, this is an academic paper titled "Quantifying Particulate Matter Emissions from Windblown Dust Using Realtime Sand Flux Measurements". The authors are Duane Ono and Scott Weaver. Do you see that?

A MR. RUDOLPH: I see it, yes.

Q This was provided to your counsel, I believe, late Tuesday. Have you had a chance to have a look at this paper?

A I have, yes.

Q Okay. So you would agree with me that in this paper,

the authors measured air pollution from windblown dust from Owens Lake in California?

A Yes. I -- I see that.

Q And they used a method called "dust ID"; right?

A They -- yes, they referenced it.

Q And they compared the results they got using that method to other methods such as those that are contained in USEPA, AP-42; right?

A They did.

Q Yeah.

MR. FITCH: So if we can go to PDF 14, please, Zoom Host. And go to the bottom of the page, please.

Q MR. FITCH: So here we have the beginning of the discussion by the authors, and you will have read, I'm sure, that the authors believe that AP-42, the USEPA methodology, drastically overestimates the emissions at low wind speed conditions and underestimates emissions at high wind speeds. You see that?

A MR. RUDOLPH: I -- I see that conclusion, but I -- again, I think this -- this overall paper is -- is not appropriate to our application. I mean, this is a -- this is a -- a large lake bed that's approximately a thousand times bigger than the entire Grassy Mine. It's a large flat area, so the terrain is

completely different. There's -- there's no vegetation. So it's a -- it's a completely different situation to what the Grassy Mountain is.

And I know that when I looked at the paper, you know, a -- a key equation that they talk about, you know, that's supposed to relate, the saltation, you know, the horizontal movement of -- of sand in this -- in this example to airborne concentrations, that equation's actually missing from this paper. So it would be very hard -- Equation 6. It would be very hard for anyone to make, I think, any reasonable assessments based on the information in -- in this paper.

I think they've made -- they've also made a couple of assumptions that they recognize as being, perhaps, incorrect and that the -- the 'U' star value was held constant, and -- and that would likely not be the case. But it's just a -- it's a completely different situation to what we're facing in the Grassy Mine, and I don't think it's an appropriate paper, and the information isn't there to allow, certainly, us to assess whether the statement that you've got highlighted in red on the stream is at all accurate.

Q Had you read this paper before I provided it to your counsel?

A No, I haven't seen it before.

Q So you don't -- you don't keep current with what other experts are doing in the area of measuring and monitoring -- just let me finish my question, sir.

You don't keep current with what other experts are doing in terms of measuring and monitoring windblown dust?

A We -- we -- we were -- we are current, I think, on what is used in regulatory applications. I know that there are -- are papers being produced by scientists based on individual studies, and, I mean, many of them come up with -- with different relationships between windblown -- or for windblown dust. This paper made the assumption, a priority, that PM 10 emissions were a function of wind to the third power. That -- that may or may not have been the case, because we can't -- can't tell from the information that's provided.

So, yes, there are many papers out there that tend to look at windblown dust, you know, in -- in -- in many applications, and they have their individual measurement approaches; they have -- they have their own conclusions. What we're trying to do in our -- in our approach is not to -- you know, is to rely on approaches that are either recommended or that are traditionally used, I guess, in the air quality assessment field.

Q Okay. There's one other sentence I want to discuss

with you in that paragraph, and that's the first one where it says that: (as read)

> The AP-42 method and the dust ID method of estimating emissions results in a very close agreement for the annual emissions but very poor agreement for the daily emissions.

Do you have any comment on that finding, Mr. Rudolph?

A I don't. I saw the numbers in the report and that the -- their conclusion follows from the information that was provided. But, again, I don't have any basis for suggesting or saying that the -- the daily emissions were not -- were not correct because of some of the methodologies that were presented here.

Q All right.

MR. FITCH: Mr. Chair, I'd like to have this paper marked as the next exhibit, please.

THE CHAIR: Mr. Ignasiak or Mr. Brinker?

MR. IGNASIAK: No objection, sir.

THE CHAIR: Okay. Can we get a number?

MS. UTTING: Mr. Chair, that would be CIAR 911.

THE CHAIR: Thank you.

MR. FITCH: Sorry. 911?

MS. UTTING: Yes.

MR. FITCH: Thank you.

> EXHIBIT CIAR 911 - AQ#2 - LLG - ONO AND

WEAVER PAPER ON DUST EMISSIONS FROM OWENS LAKE - AIR AND WILDLIFE TOPICS

MR. FITCH: So if we could go back to the tenth addendum, same -- the same page we were looking at. PDF 20. Sorry. I think we're on 21 there. Yeah. Okay. Thank you.

Q MR. FITCH: So still in that list of bullets, Mr. Rudolph, maybe --

MR. FITCH: And can we zoom in a little bit? Thank you.

Q MR. FITCH: Okay. So now I'd like to ask you about the first bullet, which states: (as read)

> Windblown emissions from surface are a function of the frequency of winds above 5.36 metres cubed per second, or 19.3 kilometres per hour, the level at which TSP-sized particles begin to move by the wind (siltation). Higher winds at the surface do not result in higher emission rates, according to EC 2009.

So, sir, again, that's -- that's that pits and quarries document we were discussing earlier? EC 2009?

A MR. RUDOLPH: Sorry, Mr. Fitch. I was on mute.

Yes, it is the same document, the same website.

Q All right.

MR. FITCH: So if we -- could we go back to that document, Zoom Host? That's AQ4.

Q MR. FITCH: So, sir, can you tell us where in the document do we find the statement that higher winds -- higher winds at the surface do not result in higher emission rates?

A MR. RUDOLPH: I believe we were at the equation -- no, we weren't, because it was in a -- in this document, I would have to go through it. Again, the -- the information -- the two methods that are described are described in a link in this document on the website, and it's the equation that we've presented in CR Number 1.

Q Well, sir, the bullet point that I just read to you states that: (as read)

> Higher winds at the surface do not result in higher emission rates, according to EC 2009.

And I put it to you, sir, that the document says no such thing.

A The --

Q Do you disagree?

A -- reference -- the reference was to the equation that was used in which it -- as you pointed out, it's the frequency of winds above 5.36 that result in the emission estimate for windblown dust. It's not the higher speeds. So we're referencing the equation in

the document or in the reference to the website.

Q I see. All right.

MR. FITCH: Mr. Chair, can we please mark this aid to cross as our next exhibit?

THE CHAIR: Any concerns, Mr. Ignasiak?

MR. IGNASIAK: No objection, sir.

THE CHAIR: Okay. Can I get a number?

MS. UTTING: Mr. Chair, that would be CIAR 912.

THE CHAIR: Thank you.

EXHIBIT CIAR 912 - AQ#4 - LLG - ENVIRONMENT CANADA 2009 PITS AND QUARRIES GUIDANCE - AIR AND WILDLIFE TOPICS

Q MR. FITCH: So, Mr. Rudolph, we have agreed already that actual wind speeds are not an input into the model; correct?

A MR. RUDOLPH: The windblown -- the -- the -- they are an input to the model. They are not the frequency of winds above 5.36 metres per second --

Q The -- the input --

A -- 'R'.

Q -- is actually time; right? It's -- it's -- it -- it's the percentage of time that winds are above a certain speed. That's the input?

A The -- that's the inventory equation that is used for reporting. What is actually used in the model is every

hour that winds are above 5.36, there is windblown emission.

Q All right. But Benga did include in its EIA information about wind speed measurements; right?

A It did, yes.

Q Yeah. And you included information from -- to Environment Canada air monitoring stations, one at Beaver Mines and one in the Crowsnest Pass; correct?

A Yes, we do.

Q Okay. And then you also include some information from two on-site stations, what you describe as the "south station" and the "north station"?

A Yes, we did.

Q Okay.

MR. FITCH: So if we can go to Aid to Cross AQ6, Zoom Host.

Q MR. FITCH: So we're just -- I was just trying to locate these on-site monitoring stations and -- so the first page of the aid to cross is one of the maps in the EIA materials. And I take it, Mr. Rudolph, you will agree with me that this is a Benga map which identifies the two on-site monitoring stations using yellow asterisks?

A MR. RUDOLPH: Yes. It's a portion of a -- of the map that's in the --

Q Yeah.

A -- in CR Number 1.
Q Yeah.
MR. FITCH: So if we can go to the next page in the aid. Just zoom in, please.
Q MR. FITCH: So you've probably figured out that what I've done here is taken another map from Benga's materials that has contour lines on it and also has UTM coordinates, at least the north coordinates, and then using information that Benga provided as to the UTM coordinates of the two sites, I tried to, eyeballing it, plot the sites in relation to the contour lines. Do you get all that?
A MR. RUDOLPH: I'm following you so far.
Q Okay. So are you able to say that generally speaking -- and I guess I should say for the record, I -- I tried to locate the monitoring stations with pink highlighter and my pen. You can see there the pink and the blue. So my question is: Have I got it approximately right? Is that, generally speaking, where the two locations are? I think we --
MR. FITCH: And now, Zoom Host, if we could zoom in even more, it would be helpful.
A MR. RUDOLPH: Yes, Mr. Fitch, I think that's fairly close.
Q MR. FITCH: Okay. So then the lower of the two is the south on-site monitoring station;

correct?
A Right.
Q And it appears to be at the top of the southern ridge of Grassy Mountain, below the summit. Is that a -- do you think that's a fair characterization?
A It's -- it's fairly close to the ridgeline, yes.
Q Okay. And then the north station appears to be in a saddle between at least three, maybe four -- well, three high points, the southern high point being the centre of the north rock disposal area?
A It -- it was a flatter area; that's right.
Q Yeah. Okay.
MR. FITCH: Mr. Chair, could we have this document marked as the next exhibit?
THE CHAIR: Concerns, Mr. Ignasiak?
MR. IGNASIAK: No, sir.
THE CHAIR: Okay. A number, please?
MS. UTTING: Mr. Chair --
MR. FITCH: It should be 913.
MS. UTTING: -- that would be CIAR 913.
THE CHAIR: Thank you.
EXHIBIT CIAR 913 - AQ#6 - LLG - LOCATIONS OF ON-SITE METEOROLOGICAL MONITORING STATIONS - AIR AND WILDLIFE TOPICS
Q MR. FITCH: Okay. Now, getting back just to the -- what we know about these two on-site

monitoring stations. Can you confirm for me, Mr. Rudolph, that the north site was in operation from July 30th to October 1st, 2014?

A MR. RUDOLPH: That's approximately correct, yes.

Q Okay. So two months?

A Two or three, yes.

Q Well, July 30th means that the months were August and September. So that's two months, isn't it?

A It is.

Q Okay. And will you confirm for me that the south site was in operation from June 25th to October 1st?

A That sounds about right.

Q Okay. And that's three months; correct?

A Roughly.

Q Three months and five days; right?

A Close enough.

Q Okay. You may have read in Dr. Young's report that the -- in his -- in his experience, to obtain an appropriate meteorological representation of a site, you need a minimum of 75 percent of available hours in each of the four seasons. Do you agree with that?

A Yes. If -- if we're going to be looking at -- at a -- using these things for an annual basis, I think that's -- that's quite reasonable.

Now, what -- what -- perhaps just to -- to

backtrack a bit. Obviously, you know, our -- our dispersion modelling was conducted using the standard Alberta Environment dataset from 2002 to 2006, so any on-site or nearby stations would've had to have data from that period for us to be able to incorporate them into the model. So the Environment Canada station at Crowsnest met that criteria. We used it in -- in developing our -- our on-site meteorological data. The Beaver Mines station didn't. I don't think it was operational in that period.

These stations on-site were really -- again, they were -- the -- the measurements were made in -- in 2014, and they're really meant to get a sense of what the winds were like on-site, not to be used at a -- in -- in an assessment of -- of some kind. Those stations were really meant, at that stage, to -- for us to be -- to get -- to get a sense of how the terrain controlled the wind. And I think the information that we've presented there shows that the winds are -- are quite site-specific, and that really helped drive our use of -- of the CALMET and CALPUFF models, helped drive things like receptor spacing, et cetera. So the -- the -- those sites were -- were not meant to be used in any sort of a year-round assessment.

Q Sir, you probably also read in Dr. Young's report that he looked at the data from the Beaver Mines monitoring

station and that they indicate that peak winds occur during the months November through January. Do you agree with that?

A I do. And the Crowsnest data's -- is the same.

Q Okay. Not June to October, like you measured on-site?

A No. I mean, our measurement program was -- was driven by our available -- or the availability of access to get on-site with the equipment that we needed to -- to measure. So it was -- it was meant to get an indication of the influence of terrain. It -- it was definitely impacted by access, and, in fact, that's why the north site went into operational after the south site, was strictly because of access.

Q And you can confirm for me, sir, that the -- both the south and the north on-site stations measured wind speed at 2 metres' height, not 10 metres?

A Approximately, yes.

Q Okay. We've already agreed that the standard measurement of height used by Environment Canada is 10 metres; correct?

A It is.

Q Yeah. So Benga made a point of saying in one of its SIR responses that high winds have not been recorded on-site; correct?

A I don't remember that exact phrasing, but ...

Q Okay. Well, we should have Addendum 10 still up. I

think that's 251. And if we could go to PDF page 24. Zoom in on the top table, please.

So you'll agree, sir, that table -- the table we're looking at is Table 1.5-2, and it's titled "Frequency Distribution of High Wind Speeds at Four Air Monitoring Stations"; correct?

A That's right.

Q The two stations in the right half of the table are the two Environment Canada stations, the one at Beaver Mines and the one at Crowsnest; right?

A They are, yeah.

Q And the two on the left -- in the left half are the on-site stations; correct?

A That's right.

Q So I'm interested in the data from the north site. So it says that there was a total count of measured hours of 1,508, so 1,508 hours of measurements; correct?

A Yes, on the north site.

Q Yeah. And then when we get down to the lower half of the table, it says that there were 44 hours with wind speeds above 20 kilometres per hour, 4 hours with wind speeds above 30 kilometres per hour, and 0 hours for each of 40, 50, and 60 kilometres per hour. Do you see that?

A Right.

Q Would you agree with me, sir, that it seems very odd

that there are basically no winds above 30 kilometres per hour recorded in those two months at that site?

A Not necessarily, no.

Q No? So you don't think that there might have been a problem with the monitoring station?

A I don't believe so.

MR. FITCH: Zoom Host, could we go to Registry Document 313? It should be Addendum 11. PDF page 12. One moment.

Q MR. FITCH: So, Mr. Rudolph, you will, I'm sure, agree with me that Benga was asked by the JRP to provide a detailed summary of wind data from the Crowsnest and Beaver Mines monitoring stations including maximum wind gust speeds?

A MR. RUDOLPH: Yes. That's what we see in Table 6.1-1.

Q Right. And so you would agree, I'm sure, that one of the things you found was that daily maximum wind gusts above 30 kilometres per hour occur frequently at the 10-metre level?

A They do.

Q Yeah. So reflecting back on the north monitoring station, is it just -- was it just located in a particularly sheltered location, do you think?

A Well, it may have been, but -- or relatively sheltered compared to the south side. That's -- that is true.

But we -- we're also comparing two different things here: The -- I mean, as I'm sure you're aware, Table 6.1-1 talks about wind gusts, and we're looking at the maximum wind gust in ten years of operation at this Environment Canada site. And a wind gust is a wind speed that's measured over three to five seconds.

So at this station -- at the Crowsnest station, there's one day in this ten-year period where we have a three -- or perhaps more than one, but a three- to five-second wind gust at 10 metres at Crowsnest. So one day in however many days that is, 3,000, thirty-seven -- 3,700.

The -- the wind information that we're presenting for the two on-site stations are one-hour average wind speeds. So that's 3,600 seconds. And that's a -- and if we go back to -- to the -- the previous table, the -- the question that was asked in that -- in that document -- or in that question was giving examples of wind speeds in the 89 to something over 100, possibly, kilometres per hour. And there was no reference in that question to whether they were looking at wind gusts or wind -- or a one-hour average wind speed, which is what our -- our models use. So our response that strong winds weren't measured on-site were referencing our one-hour values to the numbers that were questioned in -- in -- in the question.

Q Mr. Rudolph --
A So -- so -- so it's important to -- to realize that we're looking at a 3-second gust versus a 3,600-hour average -- or a 3,600-second average.
Q Sir, I'm sure you'd agree with me that if you were -- given that your site -- on-site monitoring stations measured at a height of 2 metres, the wind speeds at 10 metres would almost certainly have been higher?
A I agree. Yeah.
Q Yeah. Okay.

So then staying on this table, I note in the third bullet, you say that: (as read)

> Median gusts are higher during the summer months and lower in winter months.

Correct?
A "Median gusts ..."
Q The third bullet above Table 6.1-1?
A I -- I see that. I don't see "median gusts" in this -- in the table that you've indicated.
Q Well, I'm just asking you above -- you say that: (as read)

> Median gusts are higher during the summer months and lower in winter months.

That's what you say in the third bullet; right?
A That's what we said, yes.
Q Right. But, actually, when you -- when you look at

the table, it's quite clear that the maximum gusts appear -- or, sorry, occur most commonly in the period November through January. So you get the highest percentage in -- in those winter months; correct? The strongest gusts; maybe I should put it that way.

A You get the strongest gusts in winter; that's right.

Q All right. And those would basically be Chinooks, would they not?

A They -- they could be at -- at -- at the Crowsnest, yes.

Q Okay.

MR. FITCH: Zoom Host, could we bring up Aid to Cross AQ8, please?

MS. WHEATON: Sorry. It'll just be a minute.

MR. FITCH: Yeah. That's fine.

Q MR. FITCH: So, Mr. Rudolph, I provided your counsel with this just this morning, so that probably accounts for the delay in finding it on the system. I do apologize for that.

The document is a -- titled "Daily Data Report for November 2020 from the Government of Canada", "Crowsnest, Alberta". And I take it you would recognize this as being a -- essentially a report from Environment Canada from a monitoring station -- air quality monitoring station?

A MR. RUDOLPH: From a -- from an Environment Canada station, yes.
Q Okay. And it's for November 2020, i.e., this month; correct?
A I see that, yeah.
Q Yeah. And so you would agree with me that on November 3rd, during the currency of this hearing, the maximum gusts at the Crowsnest station was 91 kilometres an hour; right?
A I see that, yeah.
Q And two days later, November 5th, the maximum gust was 97 kilometres per hour. Do you see that?
A I do see that, yes.
Q And then there were several days where the maximum gusts exceeded 60 kilometres per hour; correct?
A Correct.
Q Would you say that this is a pretty typical November for Crowsnest Pass, or do you have an opinion on that?
A I -- I don't know. I -- I do note, though, that on the days with the -- with the maximum gust, we also had precipitation. So the inference that this might be a dust-generation event may not be correct, given the precipitation on that day.

And I would have to go back to the -- to CIAR -- addendum -- Addendum 11, I believe, and look at the November there. That document suggests that -- that at

Crowsnest, there was, again, only one day in those ten years at which we had gusts above 90 kilometres an hour.

Q Well, that's --

A So --

Q That's why --

A So that would --

Q (INDISCERNIBLE - OVERLAPPING SPEAKERS)

A So -- so you're -- so you're -- so this month may be unusual, yes.

Q I see.

Do you have any reason to disbelieve that this is an actual report from Environment Canada?

A I'm sure, Mr. Fitch, if you've provided it, is it -- it is what it says.

Q Okay.

MR. FITCH: Can we mark this as the next exhibit, please?

THE CHAIR: Any concerns, Mr. Ignasiak?

MR. IGNASIAK: No, sir.

THE CHAIR: Okay. Let's please have a number.

MS. UTTING: Mr. Chair, that would be CIAR 914.

THE CHAIR: Thank you.

MR. FITCH: Thank you.

EXHIBIT CIAR 914 - AQ#8 - LLG - DAILY DATA REPORT FOR NOVEMBER 2020 - CROWSNEST - ENVIRONMENT CANADA - AIR AND WILDLIFE TOPICS

Q MR. FITCH: All right. I want to now talk about something related but a little different, and that is controlling dust from haul roads.

MR. FITCH: So if we can go back, Zoom host, to Consultant Report Number 1A, PDF 190, please. Can you expand the width? There we go. And if we can go down -- down the page. That's good. Thank you.

Q MR. FITCH: So, Mr. Rudolph, under heading A4.7, which is "Road Surface Material Moisture and Effect of Watering", we read the following: (as read)

> It was assumed that dust was reduced by 80 percent in summer due to frequent watering of or the application of CaCl2 to the haul roads. This reduction was used in previous air quality assessments for mine operations in Alberta [and there's two references; one to Luscar and one to Coalspur. And then it goes on] and then it was increased to 90 percent in winter due to the presence of frozen ground or snow on the ground.

Correct?

A MR. RUDOLPH: Yes.

Q Okay. So, again, you or your team were responsible for this part of the document, were you?
A That's correct.
Q Okay. In the paragraph that I just read, you reference these previous air quality assessments for mines in Alberta, and one was for Luscar in 1999 and the other was for Coalspur in 2012; correct?
A That's right.
Q Okay. And I take it because you called them "air quality assessments", they were documents just like the air quality assessments in this proceeding in the sense that they were filed as part of a regulatory application before the mine actually started operating?
A That's right.
Q Okay. So these are not documents that actually document the performance -- the actual performance of the mines after they were -- started to operate; correct?
A That is correct.
Q Okay. And so would it be fair to say that the 80 percent reduction in summertime and 90 percent in winter were assumptions in those air quality assessments just like they are in this one?
A Yes, that's correct.
Q Okay. So then the paragraph that follows talks about Table A4-2, which we'll get to in a moment, and refers

to a number of studies which you say demonstrate average emission reductions of 76 percent by road watering; correct? Those are the ones from the USEPA, AP-42?

A I -- I see the paragraph, yes.

Q Yeah. And then there's a reference to other studies where control efficiencies from watering range from 69 to 88 percent; correct?

A I see that, yes.

Q Okay. So let's go to the next page, please, and focus on Table A4-2.

So there's five examples of precedents cited in that table; correct?

A There are, and I know that we've expanded this table in a subsequent SIR, which I'll have to -- have to track down for you. That probably talked a bit more about where that information came from.

Q Right. We'll get into that, so don't worry.

A Okay.

Q You'll agree with me that only one of the examples cited is a coal mine or coal mines; correct? From Wyoming?

A That's right.

Q Yeah. And the percentage reduction of PM 10 is what?

A In this -- in this table, it's 53 percent.

Q Okay.

MR. FITCH: If we can just scroll down the page a little bit so we can see that paragraph below the table. That's good. Thanks.

Q MR. FITCH: There's reference to the Grande Cache coal processing plant; correct?

A MR. RUDOLPH: I -- I see that.

Q And the reference is in relation to the 90 percent winter reduction, because what you're saying is that there are readings from Grande Cache where the dust emissions during the winter were 43 percent lower than the rest of the year; correct?

A The dust fall data, yes.

Q Okay. I noted that you didn't cite Grande Cache as one of your examples on percentage dust reductions achieved by watering in summer, did you?

A No, we didn't.

Q Is that data not available?

A It -- it may have been. I -- I -- I don't know.

Q Okay.

A I think -- I think most --

Q So --

A No, I haven't seen that information as part of this -- as part of this reference.

Q Sorry. Say that again.

A I said I -- this -- that report or that modelling study was not referenced in this -- in this section.

Q Right. I guess the issue for me is you're able to obtain readings for the months November to April. Surely there must have been readings for the months May to October. Wouldn't you agree with that?
A Are -- are you asking about the readings -- the dust fall readings?
Q From Grande Cache, right.

You cite readings from specific months, November to April, and my question is: Surely there must have been data for the months May to October? And I'm curious why there's no reference to them in your document.
A Well, I -- I -- I think by -- by saying that they were 43 percent lower during those -- during those winter months implies that it's relative to the entire year, as -- as it says. So the data would've been available to -- you know, for the entire year.
Q Okay. But you didn't think it was worthwhile to include it in your table?
A No. I mean, this was -- this -- the table references USEPA studies, so, you know, presumably somewhat controlled studies. This was information that was examined to see what the -- in, you know, the Alberta situation, what wintertime emissions would be -- or measured dust fall would be as a -- as a -- a check on whether or not dust fall was less in winter than in

summer.
Q Right. But why didn't you include a discussion of what the readings are at Grande Cache in the summer as a check on whether or not you can achieve the 80 percent control efficiency that you are aiming for?
A Well, I -- I -- I would think that we would not have information from that report on the frequency of -- of road watering, so the report was not looking at -- from my recollection, anyway, it was not looking at the road watering efficiency; it was just looking at the difference between winter and summer.
Q So you made no inquiries of the operator at Grande Cache?
A I -- I can't recall.
Q Okay.
MR. FITCH: Zoom Host, could we turn up Registry Document 55, which should be Addendum 4, and I'm interested in Attachment 2, PDF 10. Thanks. If you can zoom in a little.
Q MR. FITCH: All right. So here, Mr. Rudolph, you'll agree with me that the agency requested that Benga provide information to demonstrate that, at a minimum, 80 percent control efficiency is achievable at all times throughout the mine life; correct?
A MR. RUDOLPH: I see the question, yes.
Q Okay. And part of your response is that 80 percent is

not a minimum but an average; right?
A That's the way it was applied in the -- in the model; that's correct.
Q So sometimes it will be lower, and sometimes it will be higher?
A We -- we applied an 80 percent efficiency in the model, and the -- the implementation, of course, would be an on-site issue.
Q All right. Can we go to the next page, please? So here's -- here, I think, is your expanded table. Would you agree with me, Mr. Rudolph?
A It is.
Q Okay. So I'm interested in the coal mine example. So the second row, "Wyoming Coal Mines", I take it that's the same -- that's the same data as was reported in the first version of the table?
A It appears to be.
Q Right. Emission reduction of PM 10 at 54 percent and TSP of 41 percent; correct?
A (NO VERBAL RESPONSE)
Q Sir?
A Sorry. I'm not seeing it in my version of the table, but I'll take your word for it.
Q Just follow the row. Under the second row, "Wyoming Coal Mines", the --
A Right.

Q -- percentage reduction of PM 10 is 54, and the percentage reduction of TSP is 41; right?
A I -- I -- I see that, yes. Thank you.
Q Okay. All right. So then there are more examples cited in this table. And let's go down to the last -- or the bottom two rows. You'll agree that those are the only other coal mine examples provided?
A I see that.
Q Yeah. And we'll see -- and you see that for the first set of examples which are described as coal mines in Wyoming, New Mexico, and North Dakota, the percentage reduction of PM 2.5 is 61 percent; correct?
A In that row, that's right.
Q And then the percentage reduction of TSP is 73 percent; correct?
A Right.
Q And if we go down to the last example, more coal mines in Wyoming, New Mexico, and North Dakota, the percentage reduction of PM 2.5 is 24 percent; correct?
A I see that, yes.
Q And for TSP, 88 percent; right?
A That's right. That's right.
Q So, sir, when we look at this Table 3-1, if you were to look at only the coal mines, would you agree with me that 80 percent reduction is not representative?
A If you're looking only at -- at coal mines, I think

that's probably true.
Q Okay.
MR. FITCH: Zoom Host, can we now turn to Registry Document 70, seven zero? Should be Addendum 6. PDF page 41.
Q MR. FITCH: So, again, we're dealing with a response to an information request put to Benga, and the request was to provide an analysis of the potential for the Canadian Ambient Air Quality Standards to be exceeded if 80 percent dust mitigation is not achieved; correct?
A MR. RUDOLPH: I see that, yes.
Q Okay. And so in the first paragraph of Benga's response, you will agree with me that Benga acknowledges that if the summer control efficiency is only 50 percent, fugitive dust emissions from the haul road would be 2.5 times higher than with 80 percent control efficiency; correct?
A That sounds about right, yes.
Q Yeah. And the total PM 2.5 emissions from all Grassy Mountain mining activities would be 706 kilograms per day, which is an increase of 119 percent if only 50 percent control efficiency is achieved; correct?
A I -- I see that in there, yes.
Q Okay.
MR. FITCH: And if we can go to the PDF

42. Yeah. Next page.

Q MR. FITCH: And so these -- these emissions that are set out in Tables ECCC 12-2 and 12-3, I assume that when you did this updated modelling, you continued to use the assumption that only 30 percent of the haul roads were active at any time?

A These emissions refer to the emissions from the haul road activity itself. So it's the -- it's the vehicle movement, the number of -- of haul trips. This -- this -- this table -- you're -- you're suggesting that this is somehow linked to -- to -- or perhaps you're not. No. This -- this -- these -- these --

Q Well, I am wondering --

A These omissions are from active -- the active activities on the site, and those -- the activities that contribute to these emissions are listed there. So this would only be -- if we're talking about watering, it's -- it's clear that we've -- we're only affecting emissions on the haul road.

Q Right. Okay.

A And this is -- and this is -- and this is from, you know, wheel entrainment.

Q Okay. So you're saying there is no link; is that -- is that fair to say?

A I'm saying what, sir?

Q Is there any link between the results in these two tables and the assumption that haul roads are only active 30 percent --
A No.
Q -- of the time?
A No. This --
Q Okay.
A This refers only to the -- to the vehicle wheel entrainment.
Q Okay.
A The -- the road dust component.
Q Okay. So we've talked about the 80 percent reduction in summer through road watering. Let's now talk about the assumed 90 percent reduction in dust in the winter. So that's based on the haul roads being covered in snow or ice; correct?
A Well, not covered necessarily, but the ground may be frozen. There could be definitely snow within the gravel surface of the -- of the road. We'd expect to have in some areas, certainly, snow cover as well.
Q My understanding is that the plan is to leave the haul roads snow-covered during the winter unless it affects vehicle safety; correct?
A Again, I think snow cover -- I'm not sure what -- what -- quite what that means. But we -- yes, I think the plan is to leave the snow on the road. The snow is

obviously going to become embedded somehow into the gravel surface, and that will inhibit -- or further inhibit emissions.

Q Okay. Can someone remind me how heavy a loaded haul truck would be?

A MR. HOUSTON: I think you've got the wrong panel here, Mr. Fitch. None of us are -- are miners.

A MR. RUDOLPH: But I think -- Mr. Fitch, I think our CR Number 1 indicates the -- the weight of the trucks are about 200 tonnes.

Q Okay. So I want to -- I want to return to the notion that Chinook winds blow through the Crowsnest Pass in the winter. And you've already agreed with me and with Dr. Young that the Beaver Mines and Crowsnest meteorological stations show that peak winds occur during the period of November and January; correct?

A That's right.

Q Okay. So one of the things that happens when the Chinooks blow, I'm sure you'll agree, Mr. Rudolph, is that the temperature can rise dramatically?

A It -- it can, Mr. Fitch, but I think the -- you know, when we talk about Chinooks, we typically talk about them on the lee side of the mountain ranges, so areas like Lethbridge, for example, or closer -- farther west from there. I would typically classify those as Chinooks when the wind blows over the mountain and then

warms as it descends. If we're in the Pass to begin with, there may not be warming. If we're up in the -- in the mining area, you may not see that sort of warming as well.

Q Are you seriously telling me that in the Crowsnest Pass they don't get Chinook winds in the winter that can raise temperatures by as much as or over 20 degrees Celsius?

A I'm suggesting that -- that at the location of the mine, farther up in the mountain, those effects would be reduced because we are looking at the -- a Chinook wind, by definition, is one that flows down the slope and warms as it -- as it descends. You can definitely have strong winds in the winter in the Pass, and those winds are documented at the Environment Canada station.

Q Well, really, I guess I would've thought it was a completely uncontroversial proposition that what often happens in Crowsnest Pass in the winter is that a Chinook blows in and the snow melts because it gets really warm all of a sudden. And are you saying that's not the case, that that doesn't happen?

A I'm not saying it doesn't happen. I'm saying that the -- the -- the Chinook -- the true Chinook effect is when the wind blows down the -- and in the lee side of the mountain, the air is warmed. In the Pass and in the -- in the mining area, I would expect that to

happen less. I would expect to have that snowpack remain in the mining area, more or less, through the year.

Q Do you know why the mountain is called "Grassy Mountain", sir?

A I don't, actually, no.

Q There's a lot of grass on it; there's a lot of slopes that are south and southwest facing that get raked by winds. Do you disagree with that?

A I think our -- our -- the model winds that we've developed demonstrate that the winds are stronger there. The one-hour average winds are stronger there than in the Crowsnest Pass at the Environment Canada station.

Q Sir, how has your model or your assumption of 90 percent control efficiency in the winter accounted for rapid melting and warming during the winter months as a result of Chinooks?

A MR. HOUSTON: Maybe I --

A MR. RUDOLPH: Go ahead, Mr. Houston.

A MR. HOUSTON: Maybe I can help out here. Yeah. No. Mr. Fitch, I've been watching this very closely for three years, and we've never lost a snowpack in -- in the mine area during the middle of winter. It's -- it's been quite snowy, in fact.

Q That's Benga's position on the record?

A That -- that's what I'm telling you from my personal experience over the last three years. We've never had a -- a time when the mountain up higher has been free of snow.

Q Okay.

A MR. RUDOLPH: I think, Mr. Fitch, as well, the -- the -- the record at the Crowsnest Pass suggests that we get snow every -- on average in the winter, every four days or so. Measurable precipitation. So if there is a period where the -- the -- the snow, in fact, might melt, I would expect that the -- the ground would remain wet for a period of time before the next snowfall.

But I would also -- I would also add that the -- you know, the modelling typically assumes that there's no precipitation -- I shouldn't say "typically". That there is, in fact, no precipitation and there are -- that -- so we're looking at a dry -- a dry surface, apart from the additional effect of the -- of the -- the snow integration into the -- into the gravel of the haul road.

MR. FITCH: Can we, Zoom Host, go back to PDF page 40 in this same document? And zoom in a little bit, please. And down to the bottom of the page. All right. That's good. Thanks.

Q MR. FITCH: So in this response, Benga

proclaims its faith that it can achieve an average control efficiency of 80 percent, and then in the next sentence -- so that's the first sentence of the response. And then in the next sentence, you say: (as read)

> Furthermore, this level of control efficiency is most needed during conditions most conducive to high predicted dust concentrations. These conditions usually occur in light wind, stable, low mixing height conditions, which occur most often in evenings and during winter.

See that, Mr. Rudolph?

A MR. RUDOLPH: I do.

Q So we have, according to Benga, conditions most conducive to high predicted dust conditions during winter; is that right?

A My recollection -- let me -- let me read this again.

Oh, I -- I -- I think what it's trying to say is that typically in winter and in evenings, yes, you get lighter winds and low mixing heights.

Q If there is a -- if there's mining -- well, of course we know there would be mining every single day. So if, indeed, there is mining in the winter on a day when there isn't snow on the road, does that mean emission control will be less than the 90 percent?

A If emission controls are -- sorry. Can you say that again?
Q Well, based on what Mr. Houston told me, the assumption seems to be the roads will always be snow-covered during the winter, every single day. Is that part of -- is that -- is that what you have assumed?
A I think we've assumed that we have -- on the haul roads that we have 90 percent mitigation, yes, and how that --
Q It's not an assumption -- well -- okay. Maybe it is. Sorry. I didn't mean to interrupt you.
A It's --
Q Carry on.
A No. It's -- it's our assumption in modelling; that's correct.
Q Okay.
THE CHAIR: Mr. Fitch, not to interrupt, but just to let you know, we are at about the point where we should start looking for an opportunity for a break whenever it suits.
MR. FITCH: I think I can probably complete my questions on this line of cross in 10 minutes -- 10 to 15 minutes.
THE CHAIR: Okay. Carry on.
MR. FITCH: Should we just power through?
THE CHAIR: Sure.

MR. FITCH: Okay.

Zoom Host, could we go to Registry Document 55? It should be Addendum 4. Looking for Attachment 2. And PDF 12. Okay.

Q MR. FITCH: So here the agency was, again, asking questions about -- or asking for details about your mitigation measures for dust on the haul roads. And in the middle paragraph -- we can see on the screen -- of your response, there's reference to the potential to reduce vehicle speeds. Do you see that?

A MR. RUDOLPH: I do.

Q And you basically say, If we reduced the speed by half, that would reduce the dust by half; correct?

A According to that reference, that's right.

Q Right. And you could do that or you might do that on very dry days; right?

A One could, although perhaps Mr. -- Mr. Houston can discuss more some of the operational --

Q Well, I mean, this is your response. You're saying --

A Yeah.

Q -- that you could do that on very dry days. You could reduce the speed from 50 kilometres an hour to 25 kilometres on very dry days; right?

A According to that reference, that's the -- that's the option. Correct.

Q Okay.

A MR. HOUSTON: And, Mr. Chair, I could just add to that that we -- we could do a lot of things to adapt if -- if we had a particularly dusty day, reduce speeds, add extra watering. So those -- all those operating measures would be adaptive. We would adjust them according to the climatic conditions.

Q And that's what I'm wondering. Who determines what's a very dry day? Like, who would do that? The mine -- mine manager or -- like, who would do that?

A So we don't have an organization chart at the moment, Mr. Fitch, but -- but there would be somebody who would be responsible for mine operations and -- and would make a call on -- on things like watering and velocity and -- and things like that.

Q All right. And has Benga actually committed to do this, or is this just something you might do?

A That -- that's what we would do to manage dust if it was becoming an issue.

Q Okay. So we're clear, part of the plan, so to speak, is that on a very dry day, Benga would have someone who would make the call to reduce vehicle speeds by 50 percent?

A Or -- or increase watering or take other measures. It would be a -- a -- an adaptive approach to meteorological conditions.

MR. FITCH: And, Zoom Host, if we could

now go to Document 70 -- Registry Document seven zero, which should be Addendum 6, PDF 41.

Q MR. FITCH: So here there's a discussion of, again, what efficiencies -- what dust control efficiencies could be achieved, and Table ECCC 12-1 seems to suggest that even if you water more than twice a day you're only going to achieve a control efficiency of 70 percent. Is that the right way to read that table?

A MR. RUDOLPH: According to this document, that's -- that's correct.

Q Right. So I guess Benga disagrees with that, then?

A Mr. Chair, I think if we go back to the same document, the Environment Canada 2009, they actually have updated some of the information in there. And they reference the WRAP 2006 document. They talk about applying gravel or a suppressant to achieve an 84 percent water application. Their new guidance is 50 to 95 percent. And, again, this will be in the link -- perhaps not in the main document but in the emission -- in -- in the link to the additional information piece.

So, again, according to this document, Environment Canada water application, 50 to 95 percent. So I don't think the assumption that we've made, you know -- so this is based on more recent information. I don't think the assumption of 80 percent that we've made

is -- is out of -- out of the park. It seems to be fairly reasonable.

Q Well, sir, this is -- the document we're looking at is part of the sixth addendum; correct?

A Sorry. I --

Q The answer is, Yes, sir, it is?

A I'll take your word for it. Yeah.

Q Okay.

A I'm not sure what CIAR number it is.

Q And will you also take my word for that the sixth addendum was filed April 30, 2018?

A That sounds right.

Q So I want to be clear here. You're saying that since April 30th, 2018, Environment and Climate Change Canada has changed its recommended dust control efficiencies from the ones that are set forth in Table ECCC 12-1?

A That seems to be the reference below the table. It's a 2008 table. All I -- all I'm saying is on the current Environment Canada website, they have a -- an updated -- an updated table.

Q Right. This was current as of April 30, 2018, was it not?

A Yes.

Q Okay.

A And they've -- and they have -- they've -- well, we've -- we've referenced the WRAP 2006 document in

here, which is also referenced in the -- in the current version of the Environment Canada website.

Q Okay. Well, you have now referred, oh, many times during this cross-examination to a document accessible by a link to another document that's actually in evidence now. So I'm going to ask you, sir, to undertake to provide the updated version of Table ECCC 12-1 because it's obviously not in evidence.

A It's in a -- in a link on the -- on the Environment Canada --

Q Yeah.

A -- website which you provided as a --

Q Well, that doesn't help the Panel because it has to be on the record of the proceeding, sir. So my request is if you're telling me there's a different version -- a different, more current version of this table, to please undertake and produce it.

A I can do that, Mr. Fitch, yes.

Q Is that an undertaking Benga will give?

A MR. HOUSTON: Yeah, we can -- we can undertake that, Mr. Fitch, Mr. Chair.

Q Okay.

THE CHAIR: Okay. Can we get an undertaking number for that, please?

MS. ARRUDA: Yes, Mr. Chair. That would be Undertaking Number 26.

THE CHAIR: Thank you.
MR. FITCH: All right. And I'm just about done this line, Mr. Chair, but before I do, I'm going to ask the Zoom host to go to CIAR 89. It should be Addendum 8, PDF 158.
Q MR. FITCH: Okay. So, Mr. Rudolph, will you take my word for it that the eighth addendum was filed October 24th, 2018?
A MR. RUDOLPH: I do, yes.
Q Okay.
MR. FITCH: So can we zoom in a little bit, please, Zoom Host? Good. That's great.
Q MR. FITCH: So here is an information request, I believe, from the AER, and the request was to provide details on mitigation measures that will be implemented for dust control on-site considering seasonal variation. The response states: (as read)

> At this stage of the application process [so that's as of October 2018] the following mitigation measures are planned ...

Do you see that?
A MR. RUDOLPH: I do.
Q Okay. And the first -- well, now, hang on. I may have -- so this says -- this is construction. Let's go down to operations. I'm assuming there must be a --
MR. FITCH: If we can just scroll down,

please. There we go. I guess we're going to need to go to the next page. My apologies.

Q MR. FITCH: So the second bullet talks about water being systemically applied to haul roads to achieve the targeted control efficiency of 80 percent during summer; correct?

A MR. RUDOLPH: That's right.

Q Okay. So I guess what I'm wondering is: Is it -- is it Benga's position today that the primary control measure to deal with dust on haul roads is water?

A MR. HOUSTON: It -- it's one of the mitigations, Mr. Fitch. And -- and this whole suite of bullets are -- other mitigations, grading, for example, on a regular basis, leaving snow cover on, those are all mitigations to reduce dust emissions from the roads.

Q Right. But the default position is you're going to water the roads, and then if you can't achieve the dust control efficiencies that you tell the Panel you expect to achieve, then you will do other things?

A No. I think --

Q Is that fair?

A No. I think they all go together. Grade -- grading the roads, for example, gets the coarser material on top and -- and helps reduce dust, and that would be something that would be an ongoing maintenance item.

Q Are these all things that typically take place at other mines on other haul roads, or is there something unique about what you're proposing?
A I think this technology is pretty well-proven, if that's what you're after.
Q That is what I'm after.
So, for example, at the mines in Wyoming or Grande Cache, these are the types of things they probably do there?
A Yeah. I -- I think one of the differences you would see from mine to mine is the type of material you're -- you're -- you're dealing with for -- for the road surface. But other than that, yes, I would assume that all mines would, to an extent, use some of these mitigations.
Q Okay. And there was a reference -- I don't think we need to move the page, but there was a reference in part of this response to a fugitive emissions management plan; correct, Mr. Houston?
A Yeah, I -- I -- where -- where was that?
Q It -- well, it was on one of the preceding pages. It might have been under the construction bullet.
A Well --
Q I'm not sure. Well, let me just ask you this: Are you -- what I read was that a fugitive emissions management plan has not yet been developed, which tells

me that you are going to develop at some point a fugitive emissions management plan. Is that true?

A Yeah, but I -- I think you may have -- so -- so you may have taken a left turn here. Fugitive emissions are normally talking about the -- the emissions from the mine face, for example, where you get, say, methane coming from a coal seam, some -- something like that. So if -- if I'm -- you know, if -- if we had the specific reference, then we could be certain on my interpretation.

Q Okay. Well, it was -- what page are we on? It was PDF 158 where I read it.

A 158.

A MR. RUDOLPH: Mr. Fitch, I think in -- in the terminology of -- of the air quality assessment, "fugitive emissions" would be essentially all emissions from the mining operation, apart from the -- the vehicle tailpipe emissions. So pretty much everything else is -- is a -- would be -- would be have -- would have been termed a "fugitive emission" in this document. So really -- and our quality management plan would -- would cover off dust as well, in my view.

A MR. HOUSTON: And so --

Q So I guess --

A Mr. -- Mr. --

Q -- I didn't --

(SIMULTANEOUS CROSS-TALK)

Q MR. FITCH: Did I take a left turn or not, Mr. --

A MR. HOUSTON: No.

Q -- Houston?

A No, you did -- you did not. You did not.

Q Okay. All right.

So can someone confirm for me, has -- as of this date, has Benga prepared a fugitive emissions management plan?

A Not -- not to this date, no.

Q Okay. Thank you.

MR. FITCH: I think this is a good time to break, then, Mr. Chair.

THE CHAIR: Okay. Thank you.

Let's resume at 3:15. Thank you.

(ADJOURNMENT)

Response to Undertakings by Benga Mining Limited

THE CHAIR: Okay. Welcome back.

Mr. Fitch, just before you get started, I just have an update on a few undertakings.

So with respect to Undertaking Number 20, Benga did submit an email that clarified that the response to that undertaking was actually provided during the hearing and that it can be found in the transcript from November the 18th, which is CIAR 866, PDF pages 3774 to

3776.

And Benga also provided a response to Undertaking Number 24 and Number 25 from yesterday, and those are -- will be posted as CIAR Number 908 -- sorry, 908.

Mr. Fitch Cross-examines Benga Mining Limited

THE CHAIR: So, Mr. Fitch, you can resume. We weren't planning to sit too late today, if -- unless necessary. So if you can kind of aim for, you know, somewhere between 4 and 4:30 to take a break in your cross, that would be good.

MR. FITCH: I will do that. Thank you, Mr. Chair.

Q MR. FITCH: All right. So, Mr. Rudolph, I now have some questions about greenhouse gas emissions.

MR. FITCH: And so I will ask Zoom Host to bring back up Consultant Report Number 1A. PDF 47. Okay. And if we can zoom in a bit, please. That's great. Thank you.

Q MR. FITCH: So, Mr. Rudolph, your air quality assessment states that fugitive methane emissions from surface coal mining were estimated at 0.87 tonnes per kiloton of coal production; correct?

A MR. RUDOLPH: That's right.

Q And it states that that -- you got to that number using emission factors provided by an Intergovernmental Panel on Climate Change, or IPCC; correct?

A We did. That's correct.
Q And there's reference to an IPCC document from 2006; right?
A There is, yes.
Q Okay.
MR. FITCH: So, Zoom Host, can we call up Aid to Cross AQ3, please?
Q MR. FITCH: And so, Mr. Rudolph, we're looking at a journal article titled "Global Methane Emissions from Coal Mining to Continue Growing Even With Declining Coal Production". There's a number of authors. The first one is Nazar Kholad. Do you see that?
A I see it, yes.
Q Okay.
MR. FITCH: So, Zoom Host, if we can turn to PDF page 2, please. And zoom in. Looking at the second paragraph in the left column, the one that begins "Depth-specific emission factors".
Q MR. FITCH: Well, firstly, Mr. Rudolph, I take it you've had a chance to have a look at this paper.
A MR. RUDOLPH: I did, yes.
Q Okay. And I noticed in that second paragraph in the left column, there's a reference to a methodology for estimating fugitive emissions from coal mining and

handling developed by the Intergovernmental Panel on Climate Change, and then it talks a little bit about it, and then the reference at the bottom of the paragraph is "IPCC 2006".

So my question is: Is that the same methodology that you used?

A I don't know if it is or not. Our -- our emission factor would've been for open-pit mines, and this depth-specific one appears to be for underground mines. I -- I don't know for sure.

Q So you don't -- you actually don't know?

A I don't know what emission factor they're referencing here, no.

Q Okay. Well --

A We -- we could.

Q -- they're referencing one from the IPCC 2006. So what I'm hearing from you is: Even though the reference is the same as or similar to the one in your report, you don't actually know if it's the same methodology?

A I don't know which methodology these folks have used. The methodology that we used provided an emission factor for active mining and then a secondary factor for post-mining emissions.

Q Okay. And that's fine.

MR. FITCH: Zoom Host, can we go back to the first page of the article? And just scroll down a

little bit. Little bit more. That's good. Thanks.
Q MR. FITCH: So, sir, do you agree that methane is a potent greenhouse gas?
A I might not use that word ever, but I can see that it -- I understand that it has a -- a high global warming potential, yes.
Q All right. You don't take issue with the global warming potential of methane being 28 to 36 times that of CO2 for a 100-year time horizon?
A I -- I haven't seen numbers that high. I've seen numbers of -- of 20 or 25.
Q Okay. Do you agree that coal mines are one of the largest sources of anthropogenic methane emissions?
A I don't know that. I think this document perhaps says it.
Q Okay. So you have no opinion on that? You can't say "yes" or "no"?
A I have no opinion.
Q Okay. The article also notes that many scholars argue that current estimates of methane emissions from fossil fuels are underestimated. Are you -- are you familiar with -- with this debate in the academic community about whether emissions -- methane emissions are -- have historically been underestimated?
A I've heard the debate, yes.
Q Okay. Do you have an opinion?

A No opinion.
Q Okay.
MR. FITCH: If we could go back to PDF page 2, Zoom Host. And down to the bottom part of the page. That's great. Thank you.
Q MR. FITCH: So you probably read, as I did, that the authors used a newly developed model to estimate coal mine methane emissions? Did you read that?
A MR. RUDOLPH: I've -- I've gone through this -- this paper, yes.
Q Okay. And have you ever heard of that -- that model, this newly developed model before?
A I haven't.
Q Okay.
MR. FITCH: Zoom Host, could you go to PDF page 9, please? And scroll down, please. That should be good. Thanks.
Q MR. FITCH: So I'm just interested in a couple of the conclusions stated under Section 5, which is titled "Discussion and Conclusions". And you'll see that the first conclusion of the study is that future coal mine methane emissions and what they call after-mine methane emissions are significantly higher than what's previously been reported. Do you see that?
A MR. RUDOLPH: I do, yes.

Q And, again, I don't know if you've had an opportunity to really think about this paper, but do you have an opinion on whether -- maybe you've already answered this, but let me ask again. Do you have an opinion on whether methane emissions from coal mines have been historically underestimated?
A I -- I don't have an opinion. No, I don't.
Q Okay. And do you -- do you have any comments on the paper in the sense of do you agree with it, disagree, or were you able to form any opinion in the short amount of time you've had to think about it?
A No. I mean, again, this is a -- a paper that presents a methodology, and they acknowledge that their emissions are higher than in -- in previous studies. Whether or not that's true, I -- I -- I don't know.
Q Okay.
A But I agree that their emissions factors are higher than in previous studies.
Q Okay. And you're aware of the debate; I think you've already agreed with me?
A I am.
Q Yeah. Okay.
MR. FITCH: Mr. Chair, I'd like to have this article marked as the next exhibit, please.
THE CHAIR: Mr. Ignasiak, any concerns?
MR. IGNASIAK: No, sir.

THE CHAIR: Okay. Can we have a number, please?

MS. ARRUDA: Mr. Chair, that would be CIAR 915.

THE CHAIR: Thank you.

MR. FITCH: Thank you.

EXHIBIT CIAR 915 - AQ#3 - LLG - 2019 REPORT ON METHANE EMISSIONS FROM COAL MINING - AIR AND WILDLIFE TOPICS

MR. FITCH: So, Zoom Host, let's now go back to Consultant Report Number 1A. We should still be at PDF page 47. And if we could scroll down the page, please. That's good. Thanks.

Q MR. FITCH: So, Mr. Rudolph, below Table 4.3-1, your air quality assessment states that the maximum equivalent CO2 emissions from the project were estimated to be 362 kilotons per year in Year 19. Correct?

A MR. RUDOLPH: Yes, that's what this table shows.

Q And then you go on to say that, according to Environment Canada in 2015, total national GHG emissions were 726 megatons in 2013, and Alberta's share was 36.8 percent, or 267 megatons, and then, finally, you state that direct GHG emissions of the project in Year 19 will be approximately 0.14 percent

of 2013 Alberta GHG emissions and 0.05 percent of national emissions. Correct?

A That's right.

Q And you can confirm for me that Benga assessed that the project -- or that the residual and cumulative effects from the project in terms of GHG emissions would be low in magnitude and not significant?

A I don't recall if we actually assessed greenhouse gas emissions or not from that -- from that perspective. I don't recall, actually.

Q Okay. I think you did, but I'll have to get the reference for you. I get the impression -- and you can correct me if I'm wrong -- and I had a bit of a discussion with Mr. Houston about this what seems like a very long -- very long time ago in this hearing, but I got the impression that Benga's conclusion that greenhouse gas emissions from this project are not significant because they constitute such a small percentage of overall provincial and national emissions. Is that a fair characterization?

A I -- sorry, Mr. -- Mr. Houston, go ahead.

A MR. HOUSTON: I -- I think, Mr. Chair, that that's a starting point. I think if you look at these emissions, there are opportunities to do better than this, and that's one of the commitments we've made. For example, diesel combustion is a -- is a big share

of this. We're expecting over the life of this project that newer equipment will become available with better performance, and we've committed to keep our fleet up to date.

And the same with the electricity consumption, this 120 kilotons in Year 19. That's based on the current average CO2 per kilowatt hour in Alberta of -- I think it's 930 grams. So there are opportunities to look for green sources of electricity to reduce that number. So there are opportunities to -- to do better, but, you know, as a starting point, it's a small percentage of -- of the national emissions.

Q Okay. And I wasn't asking, to be clear, about mitigation or opportunities. But I think you've confirmed that from Benga's perspective, because this project's GHG emissions will constitute such a small percentage of overall provincial and national GHG emissions, you have assessed that they are not significant; correct?

A I -- I -- I'd have to agree with Mr. Rudolph. I -- I'm not sure if we've specifically made that assessment in the report.

A MR. RUDOLPH: Mr. Fitch, it's --

Q You don't know if you have assessed this --

A -- Mr. Rudolph. I'm --

Q Just hang on, Mr. Rudolph.

You don't know if Benga has assessed the significance of greenhouse gas emissions from the project?

A I -- I was -- I was going to say, Mr. Fitch, that we -- that we have assessed it --

Q Right.

A -- at -- at --

Q You assessed it as not significant; correct?

A That -- that is correct.

Q And the reason is because you argue that the project emissions -- project GHG emissions are such a small percentage of overall provincial and national emissions; isn't that correct?

A It's based on the low magnitude; that is correct.

Q Okay. Now, we heard in the early part of the hearing -- I guess during the socioeconomic topic session -- that Grassy Mountain will create close to 400 jobs during operations; right, Mr. Houston?

A MR. HOUSTON: Those are direct jobs at the mine, yes.

Q Okay. So when Benga was assessing significance of the greenhouse gas emissions from this project, did it consider comparing the greenhouse gas emissions from this project to other operating businesses that employ approximately 400 people?

A We -- we didn't, Mr. Fitch. This -- this is the

business opportunity we have in front of us.

One -- one thing we did note in the ECCC submission was that this -- this project, at these levels, is probably midrange when compared to other metallurgical coal mines in terms of greenhouse gas emissions per kilo -- per tonne of coal. And as I've just pointed out, there are a number of opportunities for us to improve on that when we get into operation and -- and potentially become one of the leading mines in terms of low emissions per tonne of coal. So in -- you know, in our own industry, I -- I think Grassy Mountain compares well to other metallurgical coal mines.

Q You'd agree it's pretty easy to imagine another type of business, say, a big warehouse that employs 400 people, that would have significantly less GHG emissions than a coal mine?

A They'd also produce less coal, but anyway -- yeah. No. I mean, I --

Q You're right.

A I mean, I --

Q (INDISCERNIBLE - OVERLAPPING SPEAKERS)

A I mean, I -- I mean, I can imagine an airline, Mr. Fitch, and -- and how much GHG gases do they produce per -- per employee. I mean, there's -- there's many ways to look at this.

Q Right.
A But in terms of --
Q That's one way --
A -- metallurgical coal mines --
Q That's one way --
A Yeah. Okay. I'll --
Q No, no. Go ahead.
A I'll drop it there.
THE CHAIR: Gentlemen, gentlemen --
THE COURT REPORTER: Sorry. I can't get -- I can't get any of you guys.
THE CHAIR: You're both talking over each other, and the court reporter is having a difficult time.
A MR. HOUSTON: I'll -- I'll --
Q MR. FITCH: I'm not trying to interrupt you, Mr. Houston. I just -- your answers are a bit long. So I apologize. Are you done now?
A Yes. Yes, sir. Thank you.
Q Okay. All right. So is there anything conceptually wrong with thinking about greenhouse gas emissions of a particular project and comparing it to some other type of activity that would create the same amount -- same number of jobs in a different industry?
A I -- I -- I think when you're comparing two opportunities, you need to be comparing inputs and

outputs that are -- that are like in nature. If there was another industry that would -- would produce steel with, you know, less greenhouse gas emissions, then I -- you know, I think that's a fair comparison.

But in this case -- and we've discussed this quite a bit in the first week of this hearing -- steel is predominantly -- at least new steel is predominantly produced with metallurgical coal. So, you know, if there was another way to replace steel production and not use metallurgical coal, for example, then I think that would be a -- a good comparator. But not -- you know, that -- that would be a good way to look at it.

Q Okay. So you -- you are -- you disagree that a valid way to compare or to look at greenhouse gas emissions is to look at different industries? You're saying you can't do that; that's not a fair comparison?

A That -- that's right. It would be -- it would be -- it would be like saying let's -- let's not have any airlines because they -- they produce a lot of greenhouse gases, and -- and let's do something else. It -- it -- you can't -- you can't look at it that way. You have to look at what -- what -- what you're producing and how well you're doing compared to other businesses that are producing the same thing or a replaceable -- a replacement product.

Q Okay. So the assessment -- the air quality assessment

was on Year 19. We've established that. So I'm kind of losing track. At this point, when is Year 19 likely to be? What year?

A We -- we are expecting -- well, a lot of assumptions behind this, but let's say we start producing in 2023, then Year 19 would be 2042.

Q Okay. I'm sure Benga is aware that the Government of Canada has introduced new legislation that legally obligates the federal government to set binding climate targets to meet the goal in Canada to net-zero emissions by 2050?

A Yes. I've followed that.

Q Okay. 2050 would be eight years after 2042?

A That's right.

Q We can all agree on that; right?

A That's right.

Q Okay. Would you agree with me that in order to reach net-zero emissions by 2050 -- well, hang on. Let me back up. So we had -- I had discussed with Mr. Rudolph the fact that total national GHG emissions in 2013 were 726 megatons.

Right, Mr. Rudolph?

A MR. RUDOLPH: That sounds correct.

Q Right. Okay.

So is it fair to think that in order to reach net-zero emissions by 2050, we're going to have to be a

long way below that in 2042?
A MR. HOUSTON: I -- I think that's fair, Mr. Fitch.
Q Okay. So then it follows, I think, that this project will not only not help Canada achieve net-zero emissions by 2050, it will have the opposite effect; correct?
A Actually, we should be finished production by 2048, so that's fortuitous.
Q Aren't you lucky?
All right. Mr. Mitchell. Is he still around somewhere?
A MR. MITCHELL: Yes, I am.
Q Thank you.
So I do have some questions on human health and your human health risk assessment. So we don't need to call it up, but I noticed when I looked at your CV that you have a bachelor of science in ecology from the U of C; correct?
A That's correct.
Q And then an MA in science and environmental engineering and applied science from -- in -- from Memorial University of Newfoundland; right?
A That's correct.
Q And what exactly was that degree in? What was your -- what was your area of study?

A That was a core space master's that covered a broad range of environmental engineering topics and ended in a project related to primarily wastewater.
Q Okay. And then you have a second MA in science in toxicology from RMIT University; right?
A Correct.
Q And what university is that?
A It's called "RMIT University".
Q Like, where is it?
A Melbourne.
Q Okay. Oh, Melbourne, Australia?
A Correct.
Q All right. So is that the university that -- I think it used to be called Memorial Melbourne Institute of Technology. That's what "RMIT" stands for?
A I think so.
Q Okay. And tell us a little bit about that degree.
A Again, it was another core space master's with a thesis at the end that was related to the toxicity of 1,4-Dioxane, which did -- sort of co-supervised with Health Canada.
Q Well, you might have to slow down a little bit there, sir.
A Sorry.
Q That was a mouthful. Say it again.
A So the -- so the -- the ending project was related to

the toxicity of a chemical called 1,4-Dioxane, which Health Canada had a particular interest in at the time, so it was done jointly through the university and with Health Canada.

Q Okay. I'm interested in the potential health impacts from air emissions. So there might be a bit of back-and-forth between you and Mr. Rudolph here, Mr. Mitchell.

I guess the starting point is: As I read the air quality assessment, Benga is predicting exceedances for PM 10 over the BC provincial objectives and TSP over the Alberta objectives; correct? Some exceedances?

A I believe that's correct. Maybe Randy can -- Mr. Rudolph can clarify if I'm wrong.

A MR. RUDOLPH: No. That is correct, Mr. Fitch.

Q Okay.

A Over small areas and relatively infrequently.

Q Right. Okay. So just staying on the air quality assessment for a moment.

MR. FITCH: We can go back to Consultant Report Number 1A, PDF page 117. So PDF 117, please. And if we scroll down the page. More, please. That's good. Thank you.

Q MR. FITCH: We're looking now at Section 6.4.1 in the air quality assessment, which is

titled "Fugitive Dust". Do you see that, Mr. Rudolph?
A MR. RUDOLPH: I do, yes.
Q And there's an acknowledgement, you would agree, that the magnitude of residual impacts for fugitive dust is high?
A I think that's what we've stated because we have predicted exceedances of -- of air quality standards.
Q Right. But you also say -- I think it's on this page -- that, you know -- yes, it is. You say: (as read)

> TSP is not associated with effects on human health, is considered to represent the potential nuisance effects of dust emissions.

Correct?
A Yes, we've said that.
Q Okay. So, Mr. Mitchell, do you agree that there are no human health effects associated with TSP?
A MR. MITCHELL: I'll clarify. The TSP is a very broad category that captures a lot of different things. So there are elements within that total suspended particulate which may cause human health [sic], but it is more accurate to assess them by looking at those elements specifically rather than as a big aggregate.
Q So that's pretty poorly worded, isn't it? You wouldn't agree with that, would you?

A I -- I would say that TSP as a measure is not a good determinant of human health effects, might be a more accurate way to word that.
Q Okay. And just so we're all clear here, TSP is particulate matter with a particle size greater than 10 micrograms? Is that basically right?
A I -- TSP -- and, again, Mr. Rudolph can clarify from the air perspective if I'm wrong, but it includes both the greater than 10 and the less than 10.
Q Well, but you specifically -- I mean, Mr. Rudolph, I'm sure you can agree with this. You look at -- for your air quality assessment, you look at PM 2.5, which is the smaller-grained particulate matter; you look at PM 10 and TSP. And so maybe the confusion is, sir, when you refer to "TSP" in your air quality assessment, what you're referring to is particulate matter with grain sizes higher than 10 micrograms; is that correct?
A MR. RUDOLPH: Excuse me, Mr. Fitch. No. TSP, as we've defined it here, is -- is 30 microns and less. So TSP would also include PM 2.5 and PM 10.
Q Okay. Well, we can all agree there are human health effects associated with PM 2.5; correct?
A MR. MITCHELL: I -- I think we've -- we would agree on that.
Q Okay. So ergo, if PM 2.5 is included in -- as part of TSP, there are health effects associated with TSP, are

there not?
A Again, I would word it that TSP is a bad way of actually determining those -- those health effects, but there are components within that TSP that do have human health effects.
Q All right.
MR. FITCH: Zoom Host, can we go down to the next page, please?
Q MR. FITCH: There's the quote I was looking for, Mr. Rudolph. Very clearly you state: (as read)
TSP is not associated with effect on human health.
Right?
A MR. RUDOLPH: I -- I see that, and I think Mr. Mitchell's phrasing was more apt.
A MR. MITCHELL: But I -- I would -- I think that, actually, I wouldn't disagree with that statement. TSP itself is not directly associated with human health. You can't take a concentration of TSP in air and directly associate that with human health. It is -- but that's not the same as saying that it has no effects on human health.
Q Okay. And that's fine.
And then I noticed in the next paragraph you say that: (as read)

There is no AAAQO for PM 10. It's no longer monitored in Alberta. And as an indicator of effects on human health, PM 10 has been superseded by PM 2.5.

Correct?

A MR. RUDOLPH: Yes, that's what's stated there.

Q Okay. So I guess what I'm wondering is: Is Benga basically saying don't worry about the exceedances of PM 10 and TSP because they're not associated with health effects?

A MR. HOUSTON: I don't think that's what's been said here at all, Mr. Fitch. Obviously --

Q You didn't write -- you didn't write the report, sir?

A No, but --

Q I'm asking the report author.

A You're -- you're asking what Benga says.

Q I don't need your helpful -- I don't need your helpful answer. What I want to know from the report author --

A You asked --

Q -- is that what he meant?

A You asked what Benga thinks. I'm -- I'm the policy --

Q I'm sorry. Let me re-ask the question, then.

Sir, did Millennium -- is that what Millennium meant when it wrote that?

A MR. RUDOLPH: Well, I -- if -- if I can

answer the question, I think it -- you know, we've stated precisely what we -- what we mean by that, that there's -- that there aren't any federal standards for PM 10 and that PM 2.5 is a -- a better indicator of health effects than PM 10 is.

Q So this panel shouldn't worry about the fact that there are exceedances of PM 10 and TSP; correct? That's what you're saying?

A No. I think we've -- I think we've indicated here that they're still -- there are ambient air quality objectives for -- for TSP that need to be respected, notwithstanding the fact that there aren't any airsheds in the province where -- where the Province measures TSP.

Q Okay. That's fine.

Mr. Mitchell, would you agree that our collective understanding of the health impacts of particulate matter has -- is continually evolving?

A MR. MITCHELL: Yes, the -- the science is continually evolving on particulate matter.

Q And would you agree that with particulate matter, with particulate size lower than 5 micrograms, that there's a known association with those particles being able to penetrate the lower respiratory tract lung tissue?

A The -- the smaller particle sizes in particular have -- have been known to do that, yes.

Q Okay. And, Mr. Mitchell, tell us your understanding as the -- as the health expert on the panel about the current -- the current state of science about submicron-size fractions. And I'm told those are smaller than 1 microgram. What do you -- what do you know about the current and evolving science on the health impacts associated with submicron-size particulate matter?

A I may need to caucus with some of our other toxicologists to provide a -- details on the state of science on that, but certainly --

Q Go ahead.

A So at this point, the -- the consensus positions are really all around the 2.5, and there is obviously research going on in different areas, but none of the major regulatory agencies, such as Health Canada, have taken a clear position on the submicron yet.

Q But you would agree that there is some science to suggest that when the particles are that small, they -- they essentially enter directly into your bloodstream?

A I don't -- I don't think without a comprehensive regulatory review that I'd be prepared to answer on what a consensus position on -- on that is. We do know that they do cross the alveoli barrier and get into the bloodstream, but there's still a lot of learning to do on the submicron.

Q Okay. That's fine.

So let me see if I can summarize a bit here. So would you agree, sir, that exposure to coarse, fine, and ultrafine particles is associated with adverse population health impacts?

A Again, have -- have to be -- get careful on the wording. It's not just exposure but exposure to -- you know, like any -- any exposure does depend on how much you are exposed to, but there are certainly potential human health effects from the -- the PM 2.5 and lower in particular.

Q Okay.

MR. FITCH: Zoom Host, can we pull up Aid to Cross AQ1, please? If we could just scroll down a little bit.

Q MR. FITCH: So you'll see -- well, sir, firstly, this is a journal article that has the title "Cytotoxic and Inflammatory Potential of Size-Fractioned Particulate Matter Collected Repeatedly Within a Small Urban Area". You see that, Mr. Mitchell?

A MR. MITCHELL: Yes, I do.

Q Okay. And so you may have said -- the statement I read or I -- the question I asked you just a moment ago might have sounded familiar because the first sentence you see highlighted states: (as read)

Exposure to coarse, fine, and ultrafine particles is associated with adverse population health impacts.

So I guess you disagree with that, do you?

A The -- the paper itself actually does make mention of -- it's not only the size of the particle, but the composition as well and, in particular, reference to metals and polycyclic aromatic hydrocarbons, which we have assessed separately in this case. Also, this is a -- you know, this study is -- is, in particular, a -- more of a lab assay study, so it -- it's a little bit different than actual exposure conditions. But, you know, I wouldn't disagree that when cells come into contact with particles, particularly that contain these metals and polycyclic aromatic hydrocarbons, that there is the potential for them to have an effect.

Q Right. And those -- those -- that particular -- that particulate matter could be between PM 2.5 to 10 and over PM 10? It's not just PM 2.5 or smaller, is it, sir?

A In that particular study in the Windsor area, they did measure -- they did -- they did assess these larger particles. And, again, this was not a study of people actually breathing them in, but a study of sort of a laboratory-type test.

Q Thank God it wasn't a study of people actually

breathing it in. That's not a question. That's okay. You don't have to answer that. All right.

MR. FITCH: Mr. Chair, I'd like to mark this as our next exhibit, please.

THE CHAIR: Mr. Ignasiak, any concerns?

MR. IGNASIAK: No, sir.

THE CHAIR: Okay. Can we have a number, please, staff?

MS. ARRUDA: Mr. Chair, that will be CIAR 916.

THE CHAIR: Thank you.

MR. FITCH: Thank you.

EXHIBIT CIAR 916 - AQ#1 - LLG - THOMSON ET AL. PAPER ON CYTOTOXIC AND INFLAMMATORY POTENTIAL OF PARTICULATE MATTER - AIR AND WILDLIFE TOPICS

Q MR. FITCH: Mr. Mitchell, is human health risk assessment an exact science?

A MR. MITCHELL: No. I think that it is acknowledged that there are uncertainties associated in human health risk assessment, and that is why we build conservatism into those processes and also assess the implications of the uncertainties.

Q You agreed with me earlier that our understanding -- the scientific understanding of these things evolve -- or, sorry, evolves. Would you agree with me that one

way that our understanding of science evolves is through observation?

A Well, it's a very broad question, but observation does feed into our understanding.

Q Yeah. Isn't it, in fact, that -- sort of one of the core principles of the scientific method?

A Yes, usually observation under controlled conditions is sort of one of the key elements of science.

Q Okay. Yeah. I'm just going to read to you a simplified description of the scientific method, and you tell me if you agree. (as read)

> First, make an observation; second, ask a question; third, form a hypothesis; fourth, make a prediction based on the hypothesis; fifth, test the prediction; and sixth, iterate. That is, use the results to make a new hypothesis or new predictions.

I know it's fairly simplified, but is that fair?

A As I say, that's not unconsistent [sic] with other descriptions of the scientific process that I've heard.

Q Okay. Would you agree, sir, that some of the literature on health impact assessment draws a distinction between direct and indirect measures of health?

A So you're -- you're speaking as -- now to health impact assessment as a process as opposed to the human

health --

Q Right.

A -- and -- yes. So health impact assessment is a -- is -- is a process and a -- and an activity that does look at some of those other determinants of health.

Q Okay. And maybe just so it's clear for the Panel, I think you very quickly drew a distinction between human health risk assessment, which is what you did, and human health impact assessment. Did I get that right?

A That is correct. They are -- a human health risk assessment may be part of a health impact assessment, but they are distinct processes.

Q They are. Okay.

So just pursuing this idea of direct versus indirect effects. Would you agree that cancer incidence would be considered a direct indicator of human health?

A Cancer incidence is certainly one of the end points -- end points that we look at as a direct --

Q Okay.

A -- indicator.

Q Would you agree that the discharge of a hazardous substance to the environment, by contrast, is an indirect measure of health?

A I -- I wouldn't characterize release of a substance into the environment in itself as a measure of health,

either direct or indirect.
Q Okay. Would you agree that one of the dilemmas when conducting -- or when thinking about the potential health effects from a project such as Grassy Mountain is that until the mine is built and operating, we won't know what the actual effects are, so we have to employ modelling and other things to predict -- make predictions?
A I would frame it as -- as we make these predictions in order to be able to mitigate any -- any risk of a human health effect, but, obviously, you want to make these predictions in advance --
Q Right.
A -- so that we can -- so that we can then avoid the effect.
Q Right. But if we had information on actual health effects from coal mines, that would be useful information, would it not?
A You would -- you would have to look at that information within the -- the appropriate context and -- and how it relates to the current application.
Q And, again, one of the constraints, if I could put it that way, of the environmental assessment process is there's typically just not the time or the resources to go out and -- and gather information on direct impacts. That's -- again, that's -- that's why you have to make

predictions and do modelling; right?
A I wouldn't say it's necessarily a matter of time and resources, but, rather, we're trying to make sure we're preventing adverse effects. So if you could actually go out and measure an adverse effect at your particular project, then it's -- it -- you know, it's too late. Your -- your risk assessment is -- you know -- you know, your risk assessment is intended to prevent that.
Q Right. But I mean, if we had -- if we had actual data that says living next to an open-pit mountaintop removal coal mine is associated with increased incidences of asthma, increased cancer rates, that would be pretty powerful information for a panel such as this one, would it not?
A Again, like any other information, you would have to assess it within its context and how it compares to the previous application. And one of the things that we try to do in risk assessment is the -- you know, the epidemiological studies that have been conducted feed into the toxicity data that we use in our predictive risk assessment, and we can then, therefore, strive to address those observations that way.
Q And what is epidemiology, briefly?
A Briefly, epidemiology is actually studying populations that have been -- and these are in the chemical risk assessment context -- have a known exposure to a

chemical and assessing the effects -- the health effects that way.

Q Right. And you're not an epidemiologist; correct?

A Not personally. I have some basic training in epidemiology, but I'm not an epidemiologist.

Q And your human health risk assessment is certainly not an epidemiological study?

A No. It is a predictive study, not a -- you couldn't do an epidemiological study until later.

Q Until the mine's built; right?

A Right.

Q Sir, do you acknowledge that there is extensive epidemiological literature on the health of populations living near mountaintop removal mining in the Appalachia region in the eastern United States?

A I acknowledge that there -- there have been epidemiological studies done on these populations.

Q Thank you.

And your human health risk assessment makes no reference at all to any of that literature, does it?

A Not specifically. Again, the -- the learnings from epidemiological studies go into the toxicity assessments that are done by the regulatory agencies and feed into it indirectly.

Q All right. Thank you, sir.

I'm going to put another proposition to you and

ask if you agree. "Additive interaction" means the effect of two chemicals is equal to the sum of the effect of the two chemicals taken separately. "Synergistic interaction" means that the effect of two chemicals taken together is greater than the sum of their separate effect at the same doses. Do you agree with that?

A Yes.

Q Okay. Did your human health risk assessment consider and address synergistic effects?

A We follow the recommendations of Health Canada, which is to, when there is similar end points, treat them additively. There have been various assessments done on the interactions of chemical mixtures. And, you know, the European Commission has looked at it; OECD's looked at it. And generally the conclusion has been at the sort of low environmentally relevant doses that we're talking about at these chemicals, synergistic effects either don't show up or don't show up as significantly different than additive, and all those agencies recommend using the additive approach.

Q So the answer is, no, you did not consider synergistic effects?

A Not directly because of the reasons that I just mentioned, that the additive approach is -- has been deemed defensible by the regulatory authorities and

representing --

Q Okay.

A -- what is actually observed.

MR. FITCH: Mr. Chair, it's 4:15, which seems to be about halfway between end totals -- the finish times that you gave me, so I'm going to propose that we conclude for the day. I likely have just a little bit left in the morning, but I think this would be a good time to break.

Discussion

THE CHAIR: Okay. That would be fine, Mr. Fitch.

And just a reminder. So after you in the morning will be CPAWS, and then I have MD of Ranchlands and Ms. Janusz to continue cross, and then it will be Panel secretariat and Panel after that.

So yesterday we talked about final argument, and I did say I was going to provide an opportunity for the participants to make any submissions on written versus oral final argument and then the timing of that. And with some of the constraints on oral argument being the earliest we would be able to do it, based on receipt of the ACO report, would be December 14th to 18th, and if that's not feasible, then it would be the week of January the 11th to 15th or after.

If anybody wants to make their pitch or

submissions now, that would be fine. I'll provide another opportunity in the morning, so if people would prefer to do it in the morning, that would also be fine in case there are not people here today.

So if anyone has some comments on that, now would be the time.

MR. FITCH: Well, Mr. Chair, while I've got the mic, so to speak, I'll say that after you posed the question to us collectively as to what we thought we would -- would be appropriate, I did have some email correspondence with counsel for CPAWS, the Coalition, and Ranchlands, and -- sorry, not -- yeah, Ranchlands. And I think the collective view among -- on our side -- and I'm sure I'll be corrected if I've -- if I misstate this. But I think the collective view is that, given the daunting volume of evidence, oral argument is not practical. Quite apart from this whole business of how do you deal with references, there's just so much stuff to get through that I -- I -- I don't think that oral argument would really work.

And in this proceeding, I mean, you know, often counsel for interveners like oral argument because, you know, there's a bit more blood and passion to it, but I think, given the amount of evidence that we're going to have to go through, it's -- any blood and passion is going to be on the floor by the end of it.

So I think our view is that written argument is a better idea in the circumstances. And I think also our view is that given, you know, the, I guess, unfortunate timing of the holiday period coming up, that likely having, you know -- we would need to file sometime in early to mid-January, is sort of our -- that's my general thought, is that, you know, written argument in January would make sense. That will give us time to write the argument.

THE CHAIR: Okay. Thank you, Mr. Fitch.

Does anybody want to add to that?

MR. IGNASIAK: It's Martin Ignasiak here. So on behalf of Benga, we have no objection to written argument, but I am concerned with the timeline that's been set out. We would be prepared to file our written argument within a week of the evidentiary part closing. So, you know, if we were to conclude the hearing next week on the 30th or the 1st, if we were to get through the evidence, and assuming ACO is filing something during the course of that week, we would be prepared to file, very early on the week of the -- of the 7th, our written argument. And with that kind of timeline, we think, you know, if the other side's provided a full two weeks, until the 21st, for instance, to file response submissions, and then if we're given a week for reply, would -- we'd be able to live with that.

But we certainly think that the written argument process should be concluded in -- in 2020.

THE CHAIR: Okay. Anyone else want to weigh in?

MS. OKOYE: Mr. Chair, we support -- the Coalition supports Gavin's -- Mr. Fitch's position on this. Our preference would be to have a written argument and also to present the written argument sometime mid -- early to mid-January.

THE CHAIR: Okay. Thank you.

Anyone else?

MS. JANUSZ: Hi. Yes. This is Barbara Janusz here. I'm totally in concurrence with the Livingstone Landowners, Coalition, and -- et al.

THE CHAIR: Okay.

MS. JANUSZ: And their position. Thank you.

THE CHAIR: Anyone else?

MR. YEWCHUK: Yewchuk for CPAWS. Same as the people before me.

THE CHAIR: Okay. Thank you, Mr. Yewchuk.

Anyone else?

MR. DRUMMOND: It's Robert Drummond, Government of Canada. We can work with whatever's possible. My clients have indicated a preference for written argument. I concur that the arrival of the

holiday period may give rise to some difficulties, but we will work around as we're required to.

THE CHAIR: Okay. Thank you, Mr. Drummond.

Anyone else?

Okay. Thank you, everyone, for the input. I will provide a brief opportunity tomorrow morning. I think I've heard pretty much from everybody, but just in case somebody wasn't in attendance today who wants to weigh in, I'll provide a brief opportunity tomorrow morning, and then the Panel will take that information and provide some direction, but it does sound like it's unanimous that written argument is the preferred option, so I don't see much difficulty with that. But we'll get back to you.

Is there any other measures -- or, sorry, any other business we need to take care of this afternoon?

Hearing none, we'll see everybody again tomorrow morning at 9 AM.

MR. IGNASIAK: Thank you.

THE CHAIR: Thank you.

PROCEEDINGS ADJOURNED UNTIL 9:0O AM, NOVEMBER 27, 2020

CERTIFICATE OF TRANSCRIPT:

I, Christy Longacre, certify that the foregoing pages are a complete and accurate transcript of the proceedings, taken down by me in shorthand and transcribed from my shorthand notes to the best of my skill and ability.

Dated at the City of Calgary, Province of Alberta, this 26th day of November 2020.

<Original signed by>

Christy Longacre, RPR, CSR(A)
Official Court Reporter

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