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MUILWIJK AOPA REVIEW HEARING

P R O C E E D I N G S

Volume 2

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(Via videoconferencing)

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proceedings taken virtually.

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(PROCEEDINGS COMMENCED AT 9:14 A.M.)

THE CHAIR: So welcome this morning, everyone. And, Ms. Gerbrandt, this can be on the record and begin. 09:14

Does anybody have anything this morning in preliminary matters?

MS. VANCE: Yes. Mr. Chair, this is Fiona Vance. I was just doing some rejigging so my

Internet is less unstable.

THE CHAIR: Yeah.

MS. VANCE: We have a response to the undertaking that you asked yesterday afternoon. The undertaking -- I just saw the transcript, was to advise if there's any reference or guidance in the approval policy for approval officers as to when professional engineers should be on site during construction.

And the response is there is not.

THE CHAIR: Okay, thank you. Thank you for that. 09:15

Okay. And hearing no other preliminary matters, we can start with Mr. Muilwijk's direct evidence, but we would have the witnesses sworn in. So, Ms. Gerbrandt.

C. METHERAL, A. MUILWIJK, J. LOBBEZOO, J. BOTH (For Arie and Willemina Muilwijk), sworn/affirmed

THE CHAIR: So, Mr. Metheral, the floor is yours. 09:17

MR. METHERAL EXAMINES THE PANEL:

A. MR. METHERAL: Very good. I appreciate the opportunity to present.

I would pull up my first presentations. And just to clarify for the Board, I was retained by

Mr. Muilwijk to help him through the NRCB process based on my experience with Alberta Agriculture, and I hope to present some of the extension work that I did in the past.

So if we can pull up Exhibit -- I guess part 1 from the --

UNIDENTIFIED SPEAKER: Exhibit 1?

MR. METHERAL: No, it would be Exhibit...

THE CHAIR: If you have the exhibit number, that would be great. 09:18

MR. METHERAL: Yeah, the presentation Number 1.

THE CHAIR: Ms. Taylor, are you --

MR. METHERAL: Number 99.

THE CHAIR: Ms. Taylor, are you online? Is it Ms. Taylor this morning?

MS. TAYLOR: Yes, it is, good morning. I just needed the exhibit number. I'm pulling it up now.

THE CHAIR: Okay, thank you. And, sorry, I should have said good morning earlier, my mistake. So nice to have you. 09:18

MS. TAYLOR: Thank you.

THE CHAIR: All right.

A. MR. METHERAL: All right. So without direct control of the slideshow, I'll just ask the file manager to help me go through this, and I'll just say

"next" to advance the slides.

Okay. So I received my ag engineering degree at the University of Saskatchewan, and I started my career in 2004, working for Associated Engineering.

I spent three years in the city doing some concrete work with underground storage and at the Calgary International Airport building some of the large concrete aprons for airplane taxiing and parking.

I then moved to some field consulting and remediation work in oil and gas and then eventually on 09:19
to Alberta Agriculture. I spent 13 years with those folks until December of 2019, and now I'm working on my own as an independent.

Next. My experience is, though, in Alberta Agriculture allowed me to watch the growth of roller compacted concrete in our feedlot industry. We've seen extensive adoption. I would estimate between a third and maybe 50 percent of our feedlots in southern Alberta are installing roller compacted concrete in their feedlots. This quick picture here illustrates 09:20
some work done around 2007, and at this time, we're really seeing a ramp-up in efficiency and idea-making.

This is work from -- and these photos and material is accredited to Alberta Agriculture and my time there and some of the presentations that I did for the

public.

So we can see in the bottom row here seven pens that were constructed in five days and the extent of construction. On the right-hand side, the pens are more at a completion stage, where they're being watered and cured. And then in the middle two pens, they're being kind of watered and perhaps preparation for some straw. And then we move into the next couple of pens, illustrating construction yet to be done.

Next. So a little bit of background and history. 09:21
We know that producers were looking at this to improve animal welfare, so there is some discussions around that and some extensive agriculture reporting. And we know that it's been mostly used as a surface pad to protect the integrity of the floor and more recently used as a liner.

Next. So initial trials with roller compacted concrete started at Ed Stronks around 2002. The concrete that was placed in those pens was actually rototilled in the -- the material was brought in. 09:21
Sorry, 2012. The product was brought into the pens and rototilled to make what would be a compacted concrete product in the pen.

We saw an evolution of where he then moved to rototilling it -- or sorry, mixing it offsite and

bringing it into the pens.

And then with the success of that product, there was encouragement to have commercial products available. We started to see commercial products around 2015 coming from Goldridge Sand & Gravel, which is a Turin colony; Prairie Stone out of Nobleford; Rock Solid, and I even had some requests from Burnco Environmental out of Calgary.

Next. We did see some producers attempting this to make roller compacted concrete on their own. I 09:22
believe Meuniers out of Barrhead have looked at it and I think Nelson Ranches down in Cardston due to their proximity to their own gravel supplies.

Next. Okay. We do know that Alberta Agriculture completed a multiyear study. That study was really focused on animal health and welfare, and it did look at some of the performance of RCC, but it really wasn't intended to be used as a study to look at liner, RCC as a liner. But we did -- it was a consideration within Alberta Agriculture about what it would mean to look at 09:23
RCC as a liner. It was always on our radar.

Next. We did become aware of NRCB permitting facilities, and this one started with the Stronks' application. And this actually wasn't an approval, LA17038 wasn't an approval; it was actually denied.

But we started to see where -- how permit conditions could look like.

Next. The permit was eventually approved after a Board review, and we saw the final LA18063 after the Stronks reapplied. And I believe this went through a Board hearing, this file.

Next. And quite quickly that same year, in July, another feedlot -- this is actually a covered feedlot, a barn, in Spring View Colony was approved by the same approval officer. 09:24

Next. So if we just look at roller compacted concrete installation, this is a -- will maybe be a fresh build. There's no pens. The product is being placed. And you can see some of the sophistication that was used to install this product, with heavy equipment and survey equipment to give guidance.

Next. And I think everyone would agree that in the industry, that animal welfare and performance has been a key issue. So -- and really, the rebuilding and maintenance costs of maintaining a pen floor is 09:25 something producers were always looking at.

And I would key in on this picture on the right, the deterioration of feedlot pens is a significant issue. So in this case, we're not sure if it's a naturally occurring protective layer below, but if this

were to be a compacted liner, we could see how cattle hoof action would drive manure and water deep into that liner.

So if we look at our different layers, the idea that concrete as a liner does have some merit because it is an interesting effect that cattle have on the top surface, and especially if it's a compacted liner. The degradation of a compacted liner is an issue that probably needs review also. Sorry, we should look at compacted clay liner degradation in the future. 09:26

Next. What is RCC? So just to confirm, RCC is a blend of conventional concrete materials, including water, cement, sand, aggregate. It's just mixed in different ratios, and it has a much less -- sorry, much less water content.

Sorry, next. There is some reference in the industry to flyash concrete, or they're calling it flyash. And just to confirm, flyash is just a component that can be added to the concrete recipe, and it just reduces the requirements for concrete powder. 09:26 And it still -- we still see the same performance from concrete.

Next. Really some of the design goals, this is a big picture thought. We just want to ensure that the product has sufficient paste volume to coat the

aggregates, that it produce the required mechanical strength and elastic properties, has the workability to achieve the required density, and is really -- this is the most important part -- is durable enough to endure the given environment, durable enough to endure in the given environment. And we get that from the Ready Mixed Association.

Next. This is just a quick picture I took quite a few years ago, and it just illustrates the particles, the size of the aggregate that this producer -- or this 09:27
installer chose.

This product is dry; it's not compacted. Above my hand on the left, we see compacted RCC, and above my hand on the right, we see product that's along the fence-line that's uncompacted. So ideally, we would want to get compaction on all materials, but this just illustrates kind of what it looks like. When it's wet, it looks like wet beach sand.

Next. Next. There has been some discussion about clay base preparation, and I think we would all 09:28
argue -- or would all agree that base prep is important. There are strategies that producers can implement, including equipment and product that's brought in. There is testing that can be done. And really what we're trying to avoid is the picture on the

right where we see the base is being -- soft spots are being exposed. This -- we can see this soft spot was exposed due to some proof rolling, the trucks were causing punch-out.

So we would probably try to avoid those sort of worst-case scenarios with the base that breaks through.

And next. When we start looking at RCC installation, it can be placed in the pens using heavy equipment. It's spread out with dozers or brought in with loaders and spread out with skid steers and then 09:29
compacted with vibratory rollers.

Next. There are considerations around bunks and aprons, water bowls and fence-lines and other extrusions like lighting and dust control, meaning like sprinkler units. So we would have consideration for existing infrastructure, and also for perhaps for new construction. New construction needs to consider water lines that come in and whatnot, power.

Next. We know that there is heavy emphasis on proper placement in curing and managing along 09:30
fence-lines and concrete joints and water bowls and through the swale and area.

Next. We can do testing. On the bottom left is a Schmidt hammer, and we can do things like pull cores. This is just a -- I wish I had put on a couple of more

pictures of cores. This is a picture of a concrete sample that was taken years ago. It's about -- this sample is about 11 inches, and I don't think they're pouring concrete, RCC, in this fashion or to this depth any longer.

Next. And we are looking at product failure. So I'll elaborate on this a little bit. But we do kind of have some -- there are some things we should keep our eyes open for.

Next. Sorry, just to illustrate, there's a large circle. And then the other one is a joint and the manure packing that occurs. 09:31

Next. So that would conclude my presentation on what we're seeing in the industry from about 2012 to today.

Thank you, file manager. If we could jump to part 3, 101. Okay, sorry, the reason I have three slides is I struggled sending them to the Board, but I think this will be fine.

If we -- okay, next, file manager. Thank you. We'll just start. 09:31

Okay. I'll elaborate on some of these large holes. This is a photo of some concrete RCC failure that occurred in about six months after installation. The producer claims that it was probably related to the

installation that morning, and this hole developed quite quickly. And it was a large hole that they simply excavated out, cleaned up, and poured in traditional concrete around to act as a bit of a plug for this.

So we do know what failure looks like and how large or how these appear.

Next. We do know that the joints where concrete, traditional concrete, perhaps at a bunk apron, and RCC might meet might not be an ideal straight joint. 09:32

In this photo, the product has been brought up and around where there was some bunk failure; the bunk had been replaced. So the product was simply pushed into that bunk area and brought up overtop and allowed -- and then compacted and allowed to set.

So it does allow for the product to fill in areas that are missing.

Next. This picture is a bit scary to see at first glance. And, if you recall, I sent it to a producer in 2012, Ed Stronks started this roller compacted concrete 09:33 works. This is a picture of his very first site, and we see concrete bunk on the right, roller compacted concrete on the left. And because of this -- because he was just experimenting and really learning about this, we do see the RCC deteriorating a little bit. I

wish I would have dug some of that manure packing out to see what the extent of that deterioration looks like. I would be surprised if it was -- I would say that's about a 10-centimetre gap on the surface, but I would be surprised if it was 10 centimetres all the way to the bottom. I think it's more of a rounding effect, but I can't conclude that at this time.

And we would want to ensure that we don't really see big cracks forming at our joints. But this does illustrate the packing that can occur. 09:34

John mentioned that when his producer installed the product at this site in this picture, he actually rototilled the product in the pen using a very large rototiller, and getting that product in place and having a good mix was a challenge. And we've seen evolution far beyond what Mr. Stronks did on his first try.

So worst-case, first try, we're seeing a little bit of product deterioration, but in general, this product is still 99.9 percent there. 09:35

So next slide. Okay. This is just some other photos I've taken over time. We see that on the right photo, right side of that photo, RCC being brought up to a bunk. We can see the nice joint that can form. In fact, there's a little bit of a pop-out there in the

bottom, and that's the concrete that deteriorated or broke out, but still that would be still a pretty tight joint; I don't know if that would be a millimetre wide.

On the left side, just down the bunk, we did -- there is evidence of RCC failure, and that hole is developing. So we would want to look at something like this, have a repair schedule in mind where we would cut out the concrete, remove the manure, perhaps repair the base a little bit, and have a solution to fill that, fill that type of hole because this doesn't meet the needs -- wouldn't probably meet our regulation requirements or fit really the concept we're proposing. 09:36

Next. This is some very -- more recent photos of a -- of Goldridge installing their product. What's important in this picture for consideration is that this is a cold joint, and a cold joint just means that there's been product laid down, there is an edge to that product, and it's drawing out as the other stuff is placing.

So for the installer here, as they bring material up, it's important to have a nice, clean edge, bring some product over that edge, and then compact it, but keeping in mind that the product on the right side of that photo is -- you know, it can be hours ahead of the other stuff in terms of placement and curing. So we 09:37

just want to be aware of that cold joint.

Next. This is a cold joint, and we can see the effects of the drying, but a nice, tight joint nonetheless.

Next. As I said, on new builds, we see infrastructure coming up through the RCC, so it would be important to get everything in place and then have machinery that we can get up to and close to those extrusions without damaging the extrusion and yet getting good compaction of the material. 09:38

Next. I did include a picture of some cracking that I've seen. This is very hard to tell, but perhaps in the reflection of the sun there off of the concrete, you can see that crack that kind of is going straight up the photo. And I think it is further illustrated in a little bit at the bottom of the photo. I can't see it from my position. But this crack is a random crack, and it's heading off away from me here.

I would suggest that the crack is about a millimetre or two width. So we can see -- at some point we can see cracking. 09:38

Next. Further illustrated a crack that's forming about a millimetre, and it's kind of heading up and then jogging to the right.

Next. This photo I took is interesting in that we

can see a line that goes from one alleyway into a pen; roller compacted concrete is the base here. And you can see some significant deterioration on the right side of that crack versus the left side of the crack, the water ponding on each side.

So this was a -- this is a cold joint, and I can't explain why the -- it deteriorated more on the right, but it has. And the water is kind of evidence to show that it is perhaps ponding around in areas where the material has degraded. 09:40

It would be interesting to know how much -- if water was flowing across it and this was holding water, but I never -- at the time I took the picture, I was not considering this. And keep in mind this is a cold joint.

Next. So just a quick backup picture a the site. We can make some big, nice slabs with extrusions and with some professional placement.

Next. Sorry, that concludes Part 2. Let's go to part 3, 100. 09:41

Okay, the next bit of slides here represents the Muilwijk site. So just to confirm, I was out to see Arie after the Board approved the hearings. So I took some photos of his covered feedlot and open feedlot and catch basin. The lines on the -- this photo

illustrates slope and the way the kind of the high point being where the water well is. The high point of the yard is actually maybe closer to the house and water well. Yeah, that's right. And the facilities are on the -- moving down a bit of a higher part.

The next photos that I will show you is taken from the yellow star there. So this is a look of -- on the right-hand side is open barn. You can kind of see the slope of the land moving away from the yard, and the feedlot would be -- open feedlot would be on the left side of that photo. 09:42

Next. So I'll go through a series of photos; the first grouping will be of the barn. I took a photo looking into the barn, and most of the photos are from the back section, the green part of the barn. Arie was able to remove some of the manure, pile it up for me just quickly, and expose a portion of the barn. Yes. And this is the covered pen, the covered barn, the covered feedlot.

Next. The next set of photos looks at the open feedlot, and I'm just going to illustrate this is Number 1. 09:42

Next. 2 and 3, moving down the pens.

Next. And then there was a photo taken from the catch basin.

Next. And the last photos are from the water well area. And they're positioned -- I'm about where the arrow is looking both towards the covered feedlot and then towards the open feedlot.

Next. So looking into the barn, we can see how Arie has set up the pens with the cattle and some manure. Very -- I would agree that inspecting it with cattle and manure, I would agree with Mr. Cumming that this is tough to inspect when it's been covered.

Next. But Arie was able to use some equipment to back -- and this would be normal cleanout practices. He cleaned out some of the pens for me that weren't in use. We'll just -- this is just a quick picture. Let's go to the next slide, and I'll explain further. 09:43

What would be important to illustrate is that there were pens -- all of the pad had extrusions like posts and water holes. The important part here is that when the posts were placed, there was concrete poured around the posts that sealed both the post and the joint with the RCC. It's kind of tough to see where the concrete is. I would illustrate it if I had the mouse, but you can see the different texture and just know that that's concrete that goes around the entirety of the post. 09:44

Next. Again, this is another post and a water

bowl, and this shows it a little more definition. On the bottom right side of the photo, you can see a bit of the concrete that's raised a little bit higher than the RCC, but it just illustrates that there is a concrete perhaps plug around that to seal that post hole.

Next. We do know that there's water bowls replaced, and this illustrates that the water bowls have concrete foundation, and it ties on top of the RCC. 09:45

Next. This photo illustrates on the back side of the pen, perhaps where we have a little more manure accumulation, the concrete plugs that -- used to fill in this -- these set of post holes.

Next. The white speckling isn't anything from scraping or cleaning; that's actually just bird poop from the rafters. So to explain what that is, more -- I was just able to -- what Arie did for me was I could walk across this pad looking for what would be larger, 1- to 2-millimetre cracking, and I think that's 09:46 something that you can do with basic cleanout practices.

Next. There is evidence of the roller compacted concrete around the barn itself. On each end of the barn there is I'm going to say 1 1/2 to 2 metres of

concrete on each end and perhaps a metre of concrete on each side. So you can see the -- without manure or animals, you can see the base of this pad on the external.

Next. I would just illustrate here the water runoff flows.

Next. And I'll do that with a series of photos looking more now towards the feedlot area.

Next. Next. Next. Next.

Okay. This is a photo taken from Pen 2, the middle pen, with livestock in it. And it just illustrates the bedding pack, and the manure accumulation would have been -- when were we out there? I would say we were out there mid-March. Anyways, this is kind of a spring -- spring conditions for him. 09:47

Next. Through general cleanout practices, we were -- I was able to see some of the pen in certain places. In the drier parts of the pen, the equipment doesn't clean off as nice exactly, and it does cause us -- there are challenges with manure sticking to the RCC. 09:48

So between Arie and I, Arie is at the top, I've stepped off about a 10-by-10-metre square, and I can see probably 40 to 50 percent of the RCC. And when I was looking out there, there were no obvious big cracks

or failures.

Next. We can get a little bit better cleaning when the RCC is -- or when the manure is a bit wetter. This is in the back swale where there was a snow drift. So when Arie cleaned this up, it did come off the pad a little bit better.

So, again, Arie is about 10 by -- in a 10-by-10 square away from me. And I could see the floor a little bit better. In this site, in this picture, I didn't see any cracking. 09:49

Next. I did examine the posts. These were put into the -- or, sorry, RCC was brought up to the posts and compacted around the posts.

Next. And we know RCC was brought up to features like the water bowl. In this case, the product was put in a little bit heavier I understand. And if we were to core here, perhaps we might see 6 to 8 inches or perhaps a little bit more as we get -- have a climb up to this water bowl. And this is a higher traffic area, so a little bit of concrete. RCC in this area isn't a 09:50 bad thing.

Next. So I examined the joint between the water bowl and the RCC. You can see how the concrete was brought right up to the water bowl, and there's a nice tight joint that's -- probably has a little bit of

manure kind of packed into the top surface there.

Next. I also examined the bunks. Along the bunks and where the RCC was brought in, Arie removed some of those material to examine the wood and RCC interface. And, again, there was no cracking along this, and it appears like he got in nice and close to the bunk here with compaction.

Next. I also asked Arie to kind of clean up an area in the back swale. So this is about a 5-by-5-metre little square he removed by hand. And I picked the back swale because this was where the water would be running. 09:51

Next. And in this sort of example, it does reflect what the chairman kind of suggested yesterday, picking some random spots and just looking to see what we can find. I wasn't able to see any cracking in this 5-by-5-metre square.

Next. Just a quick zoom in.

Next. There was -- we did run across some evidence of different -- different surface texture. So when we cleaned this up, it became apparent that this wasn't a crack; this was actually a wheel mark from some -- perhaps a bucket blade during install. It just left a very minor ridge in -- a little depression in the concrete, and it's pitted a little bit there. 09:52

So this isn't a crack, but we do see, you know, a little bit of pitting and popping at the very surface, but not failure. I just -- just to illustrate that we can see -- we can see things, and we can investigate them.

Next. Just to confirm, Arie, when they placed this material, the RCC, they did excavate the top of the pens out. That's the burdened material on the right side of the photo and then the RCC was placed on. And the material that they pulled out is actually 09:53
acting as a barrier right now to keep the water in the pen, and I think Arie's solution is to have the swale direct water through the three pens, out the back, and then towards the catch basin. And I'm standing at the base of Pen 3 in the very corner between the catch basin and the pen.

Next. The next photo is from the star at the back of the catch basin. So here is a quick shot, just to illustrate the feedlot pen in the background and where the proposed catch basin is and the size of it, the 09:53
approximate size.

Next. A couple of quick photos just to illustrate the material that's in the catch basin area at least and the different layers and perhaps the silty -- silty materials that we might find at surface.

Next. The last series of photos are just a couple from the water well, and it's taken from the position of the star.

Next. A quick photo to illustrate the yard. The water well is the brown cap -- or the brown steel feature, and you can see the green grass around it. There's some mounding around the well, and the barn is in the background.

Next. Another quick view of the water well in the centre of the picture with the bar -- with the open pens in the back. 09:54

Next. Next.

The next item I have is a quick video.

MR. METHERAL: Mr. Chair, in the essence of time, should we play that video or move on? Has everybody on the Panel seen the video?

THE CHAIR: Yeah, I don't recall it -- I didn't find it that long.

A. MR. METHERAL: Okay, 102 would be a quick little installation video. 09:55

Just to illustrate some construction practices, this is from 2020 site in central Alberta. You can see the heavy equipment that's being used to push product into place, the GPS guidance that's used. The skid steers that are in the background are kind of rough

placing the material, and the Cat blade is actually getting the final grade.

In the far, far background, we can see some rollers, large vibratory rollers and smaller units to get around some of the tight corners and get up to those extrusions, water bowls and the power poles.

And then, sorry, there is a fella dampening the product because this was a hot summer day.

And then just to illustrate, this is a cold joint. On the very far right you can see product being brought up to an existing -- some old material and how the product gets pushed out in front of the construction crew, dumped in front of the construction crew and then placed out in front. 09:56

That would be it for this.

And I would illustrate photos -- the photos that Arie submitted, Exhibit 51. Sorry, file manager, Exhibit 51.

THE CHAIR: Just maybe one moment. There we go. 09:57

A. MR. METHERAL: Okay, I understand these photos to be taken from Mr. Muilwijk's site and submitted to the NRCB as part of his submission. If we could just have a quick run-through of these photos.

Arie, correct me if I'm wrong, but this is some

photos of the covered pens, the bales of the covered pens.

A. MR. MUILWIJK: Yes.

A. MR. METHERAL: Next. And just to illustrate some of the equipment and practices that were used as a series of a couple of more photos.

Next. The installation of the barn on top with the wooden posts going through and the concrete, you can -- there is evidence of concrete around the posts, base of the posts in these photos. 09:58

Next. More construction photos.

Next. Next. Some construction photos from inside the pens. Is this Pen 1 or 2?

A. MR. MUILWIJK: 1.

A. MR. METHERAL: Pen 1. Next.

A. MR. MUILWIJK: This would be Pen 3.

A. MR. METHERAL: Pen 3, Pen 3 evidence of the equipment and compaction equipment.

Next. Some final product pictures. Or no, this is base -- 09:59

A. MR. MUILWIJK: Base prep.

A. MR. METHERAL: This is base, yeah, base prep.

Next. Curing with straw.

Next. This looks like a base prep.

A. MR. LOBBEZOO: And the pictures aren't all in

order; just the way that they were sent in.

A. MR. METHERAL: Next. Next. Next. Next. Or is that it? Okay.

MR. METHERAL:

That would conclude my exhibits, Mr. Chair.

I would now move from being a witness to the spokesman role and helping Mr. Lobbezoo through his -- or, sorry, actually Mr. Muilwijk through his material.

THE CHAIR: Okay, thank you. And thanks for the clarification and the presentation scope, Mr. Metheral. 10:00

Q. MR. METHERAL: Okay. Thanks, Arie.

So I would like to start, for the Board's information, Arie -- or, Mr. Muilwijk, can you tell me your background?

A. MR. MUILWIJK: All right. So I bought this place in 2012 and been raising calves on that property since that time.

The way that the whole calf process works is I get baby calves into my barn and keep them in the barn for approximately four weeks, five weeks, and then they go into outside hutches. And from the outside hutches, they then go into the weaning shelter which we built. And from the weaning shelter, they go into my corrals, and from there, they get shipped onto a feedlot once 10:00

they reach 4 or 500 pounds.

I kind of started a new way of doing things in 20 -- just when I started the permit, so that would be 2018/ 2019 I started a different approach of raising animals. So that's when that weaning shelter came into place, and I needed -- yeah, we -- so in prior -- so I should kind of backtrack a bit.

Prior to using the weaning shelter, they were in the barn for six to seven weeks, and they went into group pens outside where they still got fed milk. And then they got weaned into a corral once they were -- they got weaned, yeah, straight into a corral as soon as they hit weaning -- weaning age. And that was quite hard on the animal health and on the animal welfare, so we thought it's better to keep them in smaller groups and wean them that way. 10:01

So that's why the weaning shelter came into place, because I can keep them into smaller groups and give them water without having to worry about water freezing without proper water bowls and such. 10:02

So in 20 -- 2018 was when -- yeah. So Karl Ivarson -- or Mr. Ivarson approached me in 2019, sorry, May of 2019 with a directive order that I had to basically get a permit for my corrals because my -- yeah, my corrals were built many years ago without a

permit. And that was okay.

So that same day or the next day I called Adria -- or Mrs. Snowdon, and we started on getting -- yeah, the permit figured out.

So she came for a site visit with Mr. Joe Sonnenberg, and they then left me with part 1. And while we were there, while they were at the site visit, we talked about catch basin, different ways to deal with the catch basin because earlier Ms. Karen -- Ms. Stuart had been at my place a few years prior, and 10:03
we had talked about a catch basin, possibly getting like a small catch basin behind the corrals and then pumping it from that catch basin into my existing storages.

So we talked about that option at the time with Ms. Snowdon, and she wasn't very keen on it. She thought it would be better to have a big catch basin built.

We talked about different options, so bringing in clay, packing it down. And I already had heard about 10:04
RCC from other people. So it kind of was in the back of my mind, like hey, RCC might be the product to go with. It's somewhat cheaper than concrete, but it lasts -- it's just as good of a product.

So at the end of the day, she left me with part 1,

and we started filling it out. Then I went to her office a week or two later, and we finished filling out part 1 in her office, handed it in, sent it off. Then she left me with Part 2. And Part 2 we filled in in her office as well. Because I was all new to the process, I had no idea what was going on. So everything -- and prior to -- Part 2 of my application was filled out under Ms. Snowdon's guidance. And because I wanted to do RCC as the liner, she actually followed Stronks' file, basically everything that I had written down in my application, Part 2 came off of Stronks' application as well. So that's where I get the 6 to 7 inches of roller compacted concrete, because that was how it was written in Stronks' file as well. 10:04

So all this while, as well, I was really itching try to get this shelter built, or to get this permit through as quick and as smooth as possible because before winter I needed a shelter built for these animals.

So she was aware that I was kind of itching to get it built, and she told me several times, "Don't build without a permit." And so I waited. 10:05

And once Part 2 was sent in, we talked back and forth, and eventually I was given the date verbally, "November 14 the permit should be done, and you should

have the permit."

So I was happy as could be because, boy, if we can get this in prior to winter, that would be awesome.

So I already had booked the RCC product and whatnot for November 14. Any later in the year, and you're getting -- you're issuing -- you're dealing with issues such as frost, and you can't place RCC when it's cold.

So, yeah, November 14 it worked out perfectly with Prairie Stone to install it. It worked out perfect with Sub-Terrain to prep the site. So, yeah, it seemed like everything was coming along nicely. 10:06

November 14 rolls around and, well, the action is happening, and I still don't have a permit.

So I called Adria, or Ms. Snowdon, and she's like, "It will be another two more weeks." She was not aware that I was laying RCC. And I thought at the time it may be better I don't -- I don't have to mention it to her. It could also skew her -- how she thinks about the liner and whatnot. I just thought -- yeah, I never let her know, and maybe I should have, but at the same time I wasn't -- I was, yeah, everything was ready to happen. And I couldn't wait basically any longer. The shelter had to get built before winter. If these animals didn't have a shelter before winter, I couldn't 10:07

keep them alive. Like I basically had to quit doing my entire -- my entire setup, and nothing could flow properly without that shelter being built. That cycle had to keep going on. Animals are still coming in, animals are going -- that shelter -- yeah, basically had to get built before winter.

So I was stuck in a bit of a -- between a rock and a hard place, as you could put it. Because I didn't have a permit, and yet this was my prime opportunity to just place this RCC, get it built, get it in, get it done. 10:07

So I -- yeah, I decided I'm going to go ahead, place this RCC. In two weeks I should get this permit anyways.

And Adria was very positive -- or Ms. Snowdon was very positive about this permit, that it was going to go through. Like we had really good contact, everything seemed like it was going along smoothly. There was no indication that this was not going to go forward. 10:08

So, yeah, having that positive feedback from Ms. Snowdon, I felt quite sure that this permit is going to come.

So, then on the other hand -- yeah, I didn't have a permit November 14, but what's two weeks going to

make a difference? RCC is not going to be building yet. Just having placed the RCC doesn't mean that anything is built. There's no animals placed on the RCC. It was just placed, and I had to let it cure for a while anyways. I thought, well, two weeks I should have a permit, and everything will be fine and dandy, and we can just move on along.

Two weeks later I call Ms. Snowdon, and she's like, "Yeah, Arie, it's going to be another two more weeks." Well, okay, two more weeks, whatever, I can deal with that. 10:09

Again, yeah, I was kind of disappointed. I really wanted to get going on it. I waited all the way up till I was given a date by Ms. Snowdon, and -- so, yeah, two more weeks. Well, whatever, okay, I'll wait two more weeks.

And then the beginning of December she called me and said, "Arie, I missed a deadline for handing some things in. It had to be in by December 12" or whatever it was for the Christmas break. Because she's like, "I'll have it all ready for you prior to the Christmas break." Okay. Well, and I started building my weaning shelter at the time. Yeah, winter was coming, I had to do what I had to do. 10:09

So just before the NRCB went on their Christmas

break, she called me, and she said, "I'm not going to have it done yet. Let's -- but I will hand the permit to you January 2." I said, "Okay, great."

I kept on building, and -- well, the beginning of January rolls around and still no permit. And, like I say, I was very new to the whole process too. I had no idea exactly what was going on, and I was very much relying on Ms. Snowdon to give me input to guide me through this whole process.

10:10 And then starting of January, it seemed like things kind of changed. It was harder to get ahold of her. She wasn't answering phone calls. We emailed a little bit back and forth. For as good of a phone conversations that we were having prior to January versus after, it seemed like there was a bit of a disconnect. It went from very good talking back and forth to very hard to get ahold of her.

And then, yeah, I was kind of -- so everything was built by the beginning of January, everything was done.

10:11 There's animals inside my shelter, so whatever now, it's just a matter of waiting for the permit, yes or no.

It still -- at the time I thought well, it looked like everything was going to go through. I had followed Stronks' file, everything that they did is

exactly how I did it. So I thought, you know, what they do to the -- what they do to Stronks is exactly how they're going to make me do it. So everything was followed exactly as to how Stronks' guidelines were set out.

Yeah, I couldn't -- after that I couldn't really get ahold of Ms. Snowdon as good anymore. So, yeah, some emailing back and forth, and she felt bad for the time as well. And I mentioned in one of my emails, and I don't know if we have to bring it up, but I told her as well, "Like you first told me it was going to be November 14, and it's been now several months and I still don't have it." And she replies like yeah -- she felt bad about it. So, yeah, she -- but, yeah, she was also stuck to following her policies or whatever. 10:11

And in May I get a call from Mr. Cumming that he's taken over the file. And then I also told him, "Well, everything is actually built," and I don't think he was very impressed. However -- yeah, I couldn't backtrack on that anymore. 10:12

So then he just -- then he started to kind of ask me, like well, just how and what and when and where. And I kind of explained to him over the phone what I did and why I did it.

Anyways, he wanted me to somehow-- he told me then

in -- that my application, it wasn't clearly written how this liner was going to meet the AOPA things.

So he asked me either I had to get an engineer to approve it; two, I had to follow the Agdex guidelines, either take this RCC out, put in clay or put concrete overtop or something to follow those Agdex guidelines; three, I can keep going with exactly what I had written down, so Part 1. Part 2, Ms. Snowdon had already deemed it finished or complete earlier on. And -- but if I were to continue with the way it was written, it was going to -- he would give it a no. 10:13

So he already had somewhat -- if it kept going the way it was, he was really going to wash it off the table.

And my fourth option was to withdraw from the permit. Well, none of those options made sense to me, other than getting this RCC liner approved by an engineer.

So I contacted Mr. Lobbezoo, and he was willing to provide the documents necessary to get this material approved, especially because it was already -- it wasn't like I was the first producer to lay RCC. And permit-wise, I was Number 3; install-wise I was Number 2. So it kind of struck me as well like why, if Mr. Cumming was so new to RCC and he wanted me to 10:14

provide all these documents to prove that it met the liner, why was that not done on Stronks' file?

So I was Number 2 to lay RCC, and yet all these documents had to come out of my hands when it was already used as a permit liner in Stronks' file.

So it was kind of frustrating. Yes, I thought this would be quite easy because I was not Number 1. I could understand if I was the first person to use RCC as a liner, that there would be questions. Well, what is this? Is this going to pass all the guidelines, or whatever. 10:14

But the fact that I was Number 3 for permit-wise and Number 2 for installing, I thought this kind of would have been done or that this was already taken care of. But obviously it somehow wasn't.

Q. Mr. Muilwijk, just to confirm, did you feel like you had been through a fair NRCB process?

A. MR. MUILWIJK: No.

Q. Considering the work that had been done at Stronks' and the approval process that you were seeing? 10:15

A. MR. MUILWIJK: Definitely not. Especially with the -- and when I was asked to bring forward all these documents from my engineer to show that it met the AOPA regulations, I thought to myself, This should have been done earlier. Why now? Why on the second time? It

just -- for as easy as Stronks' file seemed to have gone, why does it suddenly become so difficult.

And I get it, maybe because I laid the RCC prior to the permit, and that's my bad. Like I said before, I was kind of stuck between a rock and a hard place at the time, but...

Q. Throughout your process, Mr. Muilwijk, you relied on Mr. Lobbezoo to submit some reports. Do you remember how many reports you submitted or have paid for, how many engineering reports you've paid for? 10:16

A. MR. MUILWIJK: I believe we've sent in three reports in all. The first report was towards Mr. Ivarson to show that the RCC was complete. The second report was in October -- or July, and then we had to revise it, and then it got sent again in October and then again a report for the RFR documents.

So there's been several documents sent by a professional engineer to show that, look, what is done here has been done good and done proper.

Q. So just to confirm, your submissions prior to 10:17 Mr. Cummings' decision was a response to an enforcement order?

A. MR. MUILWIJK: Yes.

Q. And a letter, sorry, a report from Mr. Lobbezoo on October 29th and then an amended version of that report

on November 6th?

A. MR. MUILWIJK: Correct.

Q. And those were the submissions that were used for Mr. Cumming's decisions?

A. MR. MUILWIJK: Yes.

Q. Was there any other information that you sent to Mr. Cumming?

A. MR. MUILWIJK: So he did ask for -- to change the catch basin size. He asked for a site map for the boreholes. He asked for soil testing -- the soil testing reports. That was all the information that he had asked. 10:17

Q. He did -- sorry to clarify, he did ask -- or did send you the Agdex concrete documents?

A. MR. MUILWIJK: Yes, several times.

Q. Several times. And he put some emphasis on that your concrete was to demonstrate the particulars in that document?

A. MR. MUILWIJK: Yes, which I was kind of given the option either an engineer had to approve it or I had to follow these Agdex guidelines. But then he -- seemed to me like he had to try to mix the two together, the engineer had to somehow prove that it met those Agdex guidelines. And that's where it threw me off. 10:18

Q. Does the criteria in the Stronks' file, the Stronks'

permit, does it appear to you to reflect the criteria in the Agdex documents?

A. MR. MUILWIJK: No.

Q. Did Mr. Cummings initiate any sort of correspondence after November 6th with you that he would suggest that he, as an approval officer, had closed your file and deemed your application complete?

A. MR. MUILWIJK: Could you say that...

Q. Did Mr. Cummings ever indicate to you that he deemed your application complete, meaning he didn't need any more information? 10:19

A. MR. MUILWIJK: It seemed to me he had everything he needed, and he definitely didn't ask for any more information.

Q. Did he ever -- did Mr. Cummings ever issue a deficiency letter?

A. MR. MUILWIJK: No.

Q. A deficiency letter would have been an email or a letter that would have said information is missing?

A. MR. MUILWIJK: No, nothing. And I did email him toward the end under your guidance just to ask -- to make sure that we didn't miss any information sending it in. Because on the November 4 in-person meeting, we had -- he had asked me to send a site -- or like the borehole information -- I forget exactly what was all 10:19

included in that email -- or in that -- yeah. I wasn't always sure, maybe I'd forgot to send to ask of information.

So then I emailed him in January 1, and I asked, "Like is there -- I sent you A, B, C, D. Is there anything else that you might still need or that I missed sending in?" And I emailed it several times because it seemed like I was not getting any -- any real answer. I was just going in a cycle, and we weren't getting anywhere. 10:20

MR. METHERAL: File manager, can you bring up Exhibit 64, please.

A. MR. MUILWIJK: You can maybe scroll down toward the bottom to my first email.

Yeah, at that November 4 meeting, Mr. Cumming had asked me if I could send him the soil testing report, a map indicating where the core samples were taken, and he wanted me to make a few changes on the report for Mr. Lobbezoo.

All of this was sent to him. And then -- yeah. 10:21
In this email, I asked, "Is there anything else that you need? Is there anything that you're waiting for?" And it -- his answer, if you scroll up, it was more of a roundabout way that I couldn't...

MR. METHERAL: To the top of this document,

please, file manager. Okay. File manager, can you bring up Exhibit 65. Okay.

Q. Arie, are you familiar with this email here?

A. MR. MUILWIJK: Yes.

Q. This is from January 4th?

A. MR. MUILWIJK: Yeah.

MR. METHERAL: If we have a quick look at what this email says -- or going to the bottom of the email first, file manager, please.

Q. Arie basically is asking for more information. 10:22

Okay, if we roll up. This was a Monday, January 4th. Andy responded with what he re-sent on January 1st. If we scroll up, he responded back: (as read)

"Maybe I'm not understanding, but your email does not answer my questions. If you're unsure what I'm asking, please call me. Thanks, Arie."

And Andy's response was: (as read)

"Hello. I understand you to be asking 10:23 whether or not I have sufficient information to process your application. Assuming that my understanding is correct, I want to confirm that I have sufficient information to process your

application and am currently doing so."
Are you familiar with that email and response?
A. **MR. MUILWIJK: Yes.**
Q. Did you believe you needed to follow up in any further way with Mr. Cumming?
A. **MR. MUILWIJK: No. I had asked several times, and I thought, yeah, after him resending the first email twice, then receiving this email, I thought it seems like he should have enough information to continue what he's doing, which really shocked me when** 10:23
I then went through his summary and I just -- time after time he was missing information on this, missing information on that, when he had several opportunities to go through it.

And that's one more thing I want to touch on with my story. He took the file over in May, and I kind of explained to him how I did the process with installing RCC. And it seemed like he still -- yesterday he was saying he did not really get any clear information how the bed was prepped, how -- any of that information 10:24
concerning the installation, nor was I ever asked it by him.

I sent him a bit of an email at one point in time just to indicate roughly how I had done it all, and he never asked for any further information. I was more

than willing to provide any other information concerning the -- how the RCC was installed.

And as well, I would like to relate one more little story -- story, a little addition. Mr. Cumming had -- when I -- when he took the file over, it seemed like he was making it very difficult for the RCC. I asked him too about Stronks' file. They seemed to have RCC, and everything went fine, no big deals with the permit. So I asked him like what is the difference -- what makes it -- mine so different than Stronks' file. 10:25
We were doing exactly the same thing. And he mentioned to me Stronks, they have enough clay. Like they had already had an existing clay liner, so they were just placing RCC on top of the clay. I thought, okay, whatever. And I just thought about that for a while. You know, this doesn't make sense.

Then on November 4, when he met me in person on site with Mr. Buscar (phonetic), I asked him again. I said, "You know, you mentioned to me that Mr. Stronks had clay as an underlying liner." So I asked, "Why 10:26
would Mr. Stronks put an engineered liner on top of an existing clay liner, why would he go through all that work if he already had an existing clay liner?" That made no sense to me.

And then Mr. Cumming kind of went and backtracked

a bit and said it was a very complicated file, and -- but it just -- why not be honest with me right off the bat is -- definitely he could have been a little more honest there right at the start and just say, "No, look, this was a new thing."

Q. Mr. Muilwijk, I would also ask you to confirm the email from science tech team from November 3rd. I believe that is Exhibit -- sorry, I apologize, I'll find this exhibit first.

Mr. Muilwijk, can you talk about the costs that you're experiencing from what would be what you thought was the fall of 2019 where you were expecting an approval and the -- starting at that time, what are the costs that you've seen due to the delays and the changes and the engineering work that you've had? 10:27

A. **MR. MUILWIJK: Well, definitely I've had to provide several documents concerning these -- to show that this RCC is an approved liner. So I -- yeah, Mr. Lobbezoo has sent several documents, which I will have to pay for. Yeah.** 10:27

And then going from basically assuming that this permit was going to go through in a short amount of time to where we are now, in the middle of a hearing, the engineering costs have been in the tens of thousands of dollars. Never mind that all this time,

I've been waiting for a permit as well. I haven't been able to populate my facility to its full capacity, which is in the tens of thousands of dollars. I've lost income there because I've only been sitting at half -- instead of running let's say 1600 head, I've only been able to run 500 head the last few months. And that's all due to other issues too concerning my enforcement water and whatnot.

And I agree that that had to be put in place, and that's fine. But if this permit had been granted as to when Ms. Snowdon said it would be through, that's a year and a half now since November 14 basically to now where things have been up in the air. 10:28

I've had workers go through as well. Yeah. It's been a -- it's been quite a -- quite a journey.

Q. So there has been added expenses --

A. MR. MUILWIJK: Definitely.

Q. -- to your operation?

MR. METHERAL: Okay, file manager, can you bring up Exhibit 48. I found what I'm looking for here. 10:29 Yes, this is the one. This is an exhibit from Walter Ceroici and the response from the science tech team. We had a quick discussion with Andy about this yesterday.

If we look down at the bottom of this page, I'll

let the Board read this document. It's an exhibit -- or introducing the Wood report -- that's good -- introducing the Wood report from Mr. Lobbezoo. If we scroll up, the correspondence from Mr. Lobbezoo to Arie, and then -- scroll up, up, up. And then from Mr. Cumming, he's asked his science tech team to help him understand the submission. And keep in mind this is the October 29th submission. In this we see that Mr. Cumming describes it as 6 inches to 7 inches of roller compacted concrete to make a durable liner professionally installed. 10:30

Now, we're talking about the report that he's just received with all the details about how the liner meets criteria, and in his next sentence, it suggests there's no additional information provided.

MS. VANCE: Mr. Chair, it's Fiona Vance. I'm sorry to interrupt, Mr. Metheral, but this email does not have anybody on your panel participating in it except maybe at the bottom where the report was forwarded. 10:31

MR. METHERAL: Yeah, I'll get to my point.

MS. VANCE: I'm just hoping that you're getting to a question that Mr. Muilwijk can answer.

MR. METHERAL: Yeah, I will.

MS. VANCE: Thank you.

Q. MR. METHERAL: We'll scroll up to the next correspondence. It's the response from Walter, and it basically asks some questions, provide specific information, resources, and provide a method -- these are the words in red: (as read)

"Provide the methodology and the calculations in response to the Woods report."

Mr. Muilwijk, did this email ever get forwarded to you from the science tech team? 10:31

A. MR. MUILWIJK: No.

Q. Did Mr. Cumming direct you verbally that this was a requirement for the -- from the tech team to be answered?

A. MR. MUILWIJK: No.

Q. Thank you. Arie, do you have any other additions you would like to talk about for your submission today?

A. MR. MUILWIJK: No, I don't think so. Just end with an ending statement that all in all, it's been a two-year journey, and it's definitely had some -- yeah, it's been a long journey, and hopefully we can get through this. 10:32

Q. Very good. Thank you, Mr. Muilwijk.

MR. METHERAL: Mr. Chair, I would move on to Mr. Lobbezoo's exhibits.

THE CHAIR: Yes. Perhaps we could take -- well, what would be now 13 minutes. Let's take till 10:45 for a short break and then continue at that point with Mr. Lobbezoo. I think it's a reasonable break point here.

Thank you very much, and thank you, Mr. Muilwijk.

(ADJOURNMENT)

THE CHAIR: Okay. So, Mr. Metheral, please continue with Mr. Lobbezoo.

MR. METHERAL: Thank you, Mr. Chair. 10:50

Q. I would ask Mr. John Lobbezoo to provide his statements here. Can you perhaps start with your education and experiences?

A. MR. LOBBEZOO: Sure. So John Lobbezoo here.

I grew up in southwestern Ontario, on a farm actually, a small family farm, so that's where my roots would come from, if you will.

In 1992 I entered Fanshawe College. I got a diploma in civil engineering technology. My first experience as a materials testing technician, if you will, was in a co-op program in 1994 for the Ministry of Transportation of Ontario. 10:51

After graduating I -- from the college, I came to Alberta, and I started in 1996 as a geotechnical technologist for a national company. It was

Jacques Whitford at that time; it's Stantec now.

I was responsible in those days for concrete and compaction testing, as well as geotechnical drilling, logging boreholes. Included with that would be environmental assessments, including monitoring well installations and monitoring, and the like.

So in those days, it did become apparent that to move forward in that career, you needed to have a degree. So in 1999, I entered Lakehead University. I graduated in Lakehead in 2001. 10:52

In Lakehead, given that I was a geotechnical technologist prior, I did focus, where I could, on geotechnical engineering. And at that time we had a new professor that came from the University of Saskatchewan to Thunder Bay, Dr. Si Vanapalli, and he was really interested in unsaturated slow mechanics. This was an emerging sort of subdiscipline, if you will, to geotechnical engineering. It's a subset, I suppose, of saturated soil mechanics that we base this all -- most of our conventional calculations and 10:52 geotechnical wisdom on.

So with Dr. Vanapalli, I did my degree project for him. And if you would Google my name, along with "soil permeability," you would readily see various articles that I had authored and coauthored, conference

proceedings pertaining to soil permeability, unsaturated soil permeability in particular. And what we were looking at was how do you predict unsaturated soil permeability relative to saturated soil permeability. And I'll talk about that later, but just as a background, I just wanted to get that in there.

Okay. So after graduating in 2001, I joined a consulting firm in Thunder Bay. I had no money to leave Thunder Bay, so -- but it was good. I was primarily a geotechnical engineer, but also an environmental -- I did a lot of environmental work. 10:53

So one of the key things that we did was look at wood waste sites and the landfills and monitoring programs for those and outlining attenuation zones and in essence keeping the regulators happy.

So I did that until about 2005, at which time I got transferred through that same company to southwestern Ontario.

So in southern Ontario, this was home for me. This was a return to home for me. This was London. I quickly was exposed to the Ontario Ministry of Agriculture, Food, and Rural Affairs; they call that OMAFRA. They had adopted similar regulations to AOPA in 2003, and at that time, the farmers were also struggling with, you know, adopting that and playing by 10:54

these rules.

So very quickly I was doing site characterization after site characterization all over southern Ontario. Having a farming background and knowing many of these people, that was a good fit.

My wife is from Alberta, so in 2009 we moved home for her, and that's when I joined this office in Lethbridge, Alberta.

When I joined here in Lethbridge, I was in the capacity of a senior engineer at that time, and it 10:55
didn't take very long to sort of be presented with some of the dilemmas that our producers were facing and their challenges with the NRCB. Of course, I got to start with a couple of problem files, and what I found was that we had consultants; sometimes they weren't professional engineers, sometimes they were. They were providing the NRCB with bits and pieces of data so that the approval officer could fill in Part 2 of the form. And they were leaving the approval officers to their own devices, and sometimes with the technical support, 10:56
maybe often, I don't want to speak too much for them, to make a decision on whether a site met the definition of a hydraulically secure site as far as subsection -- or Section 9 subsection (5) of the AOPA goals.

And it was very obvious that was a problem. And

it was like if you read the AOPA, this just needs to be an engineered opinion; right? Let's lay out the data and provide the engineered opinion.

And so I did that, and it took a couple of iterations at first, but I was able to, you know, outline the calculations that they wanted, show what the equivalent depth thicknesses were to compare it directly to the letter of the law, if you will, the AOPA. And I can say in short we developed very quickly a healthy working relationship with AOPA where I could work with the farmers and on their behalf provide an engineered opinion to support their NRCB permit applications. 10:57

So I think that's important just to understand how I would approach the view of the RCC being the -- an acceptable liner; right? The AOPA provides the criteria, and they offer the opportunity for the engineer to make his opinion, provide his opinion on whether this meets or not. So this is the mindset that I go into. 10:58

So when I write a letter providing that opinion, I expect that that carries weight and satisfies the AOPA requirements.

They -- again, there has been back and forth between these previous submissions, and I'm always

happy to clarify and provide NRCB with what they want. That's the relationship that I have developed with these approval officers.

I need to move this along.

Q. So perhaps can you tell us a little bit about your experience with concrete?

A. MR. LOBBEZOO: Sure, okay. So when I joined this Lethbridge office, one of the staff members here was a 40-year veteran of -- technician. He was -- he had extensive experience in concrete, concrete mix designs, 10:59
issues relating to concrete, and I had the privilege of working side by side with him for a couple -- for three years, three and a half years; after which, unfortunately, he did pass away.

He got me into creating mix designs and, you know, identifying the problems, problems with mixes, problems with placement, different challenges that we have with our aggregates in this area. It was a wealth of expertise that I could start with.

In this area, we have, as you may well know, 11:00
numerous Hutterite colonies, and many of them have their own concrete batch plants. So there is ample opportunity here to provide different mix designs for different materials for so many different providers.

When I was in the previous cities, in Thunder Bay

or in London, for instance, you only got your concrete from a handful of places, that was it. And Lafarge had all of their own people, Inland had their select crew...

THE CHAIR: For some reason -- can anybody hear me? I'm not hearing Mr. Lobbezoo.

MR. WIEBE: I can hear you as well. I imagine his connection may have dropped.

THE CHAIR: Yeah. So everybody is having the same issue then? 11:01

MR. GRAHAM: Yeah.

MS. FRIEND: This is Laura. And yeah, it looks like they're frozen on the screen, but I can hear everyone else.

THE CHAIR: So we'll just give them a second. Oh, there we go. They may try to sign in again.

MR. WIEBE: They did. Yeah, they left and they'll --

THE CHAIR: Oh, here we go. All right. Oh, welcome back. Something happened. A little drop in your signal, or... 11:01

A. MR. LOBBEZOO: Any idea where we ended?

THE CHAIR: Yes. So, Ms. Gerbrandt?

THE COURT REPORTER (By reading): You ended:

"When I was in the previous cities, in

Thunder Bay or in London, for instance, you only got your concrete from a handful of places, that was it. And Lafarge had all of their own people, Inland had their select crew..."

And that's where it ended.

THE CHAIR: Thank you.

A. MR. LOBBEZOO: Yes, thanks.

Okay. So when I came to Alberta with all these small producers, there was credible opportunity to provide, you know, all of these mix design information to all these small producers. So that's been quite an opportunity in the last number of years for me at this office. 11:02

Beyond that, as far as concrete experience goes, I am -- our lab here is a member of the CCIL. It's a CCIL-certified laboratory, and I'm the responsible engineer for that laboratory. Our office is a member of Alberta Ready Mix Association, and I am a -- with the Ready Mix Association, I'm a qualified member -- or qualified inspector to inspect batch plants. 11:03

So that would be my concrete experience.

So in terms of RCC, I just want to discuss the experience that I have on that. Again, I referenced the previous technician that was in this office. That

technician had quite a bit of experience with soil/cement stabilization and doing that on roadways. He had some experience with flyash stabilization in feedlots, particularly for feed alleys and those sorts of things.

And then in -- just after 2010, I know Cody said 2012 in his presentation, but it was a little bit earlier when Ed Stronks started with his rototilled gravel/cement flyash blend in the first series of pens.

So this office was directly engaged with that with the support of this previous technician that worked here. 11:04

And it wasn't too long after that that I started getting involved with that.

In about 2014 -- did I go off again?

THE CHAIR: No, you're good here. Does everybody else hear... Okay.

A. MR. LOBBEZOO: I had a thing flash on my screen that said "connection unstable."

THE CHAIR: That may be what happened before. That usually tells you Zoom is saying that you've got a little bit of a weak connection perhaps, so we'll see how it goes. 11:04

A. MR. LOBBEZOO: Okay.

In 2014 I was approached -- so after Stronks did

his initial in-place compaction of RCC, Stronks moved to blending it in an old tub grinder at the edge of the feedlot and bringing that material into his -- into his pens and doing it that way. And this office had some involvement with that as well.

My understanding is that that was not a real feasible approach for Mr. Stronks. So then he went to look for a supplier to provide this material for him, and that's when, as I understand, Goldridge Sand & Gravel became involved with that. And the reason why 11:05
that's important is Goldridge Sand & Gravel initially came to this office, to me in fact, to work with them on various mix designs with materials that they had.

So I supported them in preparing mix designs. We did test batches in this lab. We did compressive strength testing. We did freeze/thaw testing. We cycled cores through freeze/thaw cycles to see how they -- what kind of losses there would be with respect to difference materials that they had been using. And
of course I can't disclose all of the particulars of 11:06
that, because that's proprietary, as far as Goldridge goes.

But, nevertheless, in terms of my experience, that's where my real involvement with RCC began.

In about 2015, as you are aware, Alberta

Agriculture did this animal health study; maybe it was 2016. All of the cores that were sampled by them came through me, came through this office. I reviewed them all. We trimmed them, we tested them, we ground up samples and sent them to chemical laboratories. I don't know how many cores that came through there. Well over 100 cores that they did they brought here.

I continued to support Goldridge, probably through to about 2018, and in the meantime -- or in that time, I started supporting Prairie Stone. And Prairie Stone is a supplier of the Gold -- of the subject, the Muilwijk project. 11:07

Initially, we were not doing mix designs for them; John Both was doing that. But we were doing the compressive strength testing for Prairie Stone, and we were doing his grain size analysis to support mix designs.

And then in the last couple of years, we've done some test batches for Prairie Stone. Prairie Stone, their approach to concrete would be to source materials proximate to the project site and set up their plant there and use that material. 11:08

So when they would have possibly challenging materials, they would bring them to the office. We would look at them. We would blend them appropriately

and run test batches to make sure that we were getting the product that they were looking for.

So that would generally summarize my experience with RCC.

There is one other item. There is an industrial road near Lethbridge that was proposed for RCC. I did the engineering submission to support that RCC roadway project, potentially also as a test section. That project did get built, and we were involved with inspection and testing on the first half of that 11:09
roadway. We have not been involved in the last year.

That would -- I think that would summarize my experience.

Q. MR. METHERAL: Great. Can you now speak to your experience with RCC installation, Mr. Lobbezoo?

A. MR. LOBBEZOO: Okay. So expand on your question.

Q. Just talking specifically -- give us some quick examples of the producers you worked with for RCC installation and the Stronks' permit that you guys supported? 11:10

A. MR. LOBBEZOO: Okay, yes. Okay. I think where this is leading to is my involvement with the Stronks' project, and I think that's important for this discussion.

With the Stronks' project, the way that we would

start a project, the way the producer would start a project is he would contact me. We would talk about, you know, does your site meet natural-occurring protective layer. So when things initially started at Stronks, at least my involvement, was when the driller went to site to drill the boreholes and, you know, prepare permeability test wells to support an application.

Basically what happened is the driller phoned me on that project and said, you know, he's not going to be able to set up test wells; it's not going to meet hydraulics protective layer. 11:11

So my next involvement on that was during the actual installation, I had a discussion with Carina, maybe two discussions with Carina Weisbach, that's Ms. Weisbach, of the NRCB. She was the approval officer, but really limited involvement with the actual Part 2 of the application. We did get involved when the RCC went to construction.

So at that time, we had technicians working for Sub-Terrain during the placement to monitor compaction and make sure that they were achieving their densities. And we were referencing, of course, the NRCB permit for that. 11:11

Q. And to confirm, Mr. Lobbezoo, the concrete supplier

was?

A. MR. LOBBEZOO: The concrete supplier was Prairie Stone.

Q. Prairie Stone Concrete. The installation crew was?

A. MR. LOBBEZOO: The installation was done by Sub-Terrain -- was it excavating, Sub-Terrain.

Q. And the RCC mix design was?

A. MR. LOBBEZOO: I understand that was provided by John Both, but I did not provide that.

Q. All right. 11:12

A. MR. LOBBEZOO: Where I came in was I was the one that actually signed the substantial completion report. I provided the stamped engineered letter in accordance with the permit conditions on that project.

Q. Thank you.

A. MR. LOBBEZOO: So that would be my experience.

Q. Okay. If we move to your experience at the Muilwijk site?

A. MR. LOBBEZOO: Yes.

Q. What can you tell me about Arie's site and the work that was completed? 11:13

A. MR. LOBBEZOO: Okay. I was first contacted by Arie very early on in his experience with NRCB. I would expect that I was on site shortly after his first contact with Mr. Ivarson where we went to site and

started drilling boreholes and looking at the actual soil to see if there was a near-surface clay layer that we could perhaps test to see if it would meet a natural occurring liner.

That was done in conjunction with some drilling that Chilako Drilling did, and the determination at that time was, no, these site soils are not going to meet natural occurring liner. We weren't going to try to argue that the uppermost groundwater resource was going to not be present or whatever and try to -- we weren't going to try to mobilize the underlying till for his permit. We thought that was too much of an uphill battle. 11:14

So the next time that I got involved was when they started discussing RCC. I had understood that there was a permit application that was put in place for that, and I had no involvement with that.

When I got involved was a phone call with -- from Sub-Terrain Excavating immediately before they were planning or immediately before they came out to do the actual placement. And they in fact asked for me to be on site for that and to monitor the work. And I told them that because they didn't have a permit, I knew that -- I had figured out that they did not have a permit for that work, that it put me in a bit of a 11:14

compromised place. As a professional engineer, for me to be actually on site doing work, it's perhaps not the ethical thing for me to be doing when there's not a permit in place and when I know there's not a permit in place. So I chose not to be on site for that.

Nevertheless, I did have a discussion with Sub-Terrain and also with Arie, you know, obviously about the risks with working without a permit, but also I relayed the permit conditions that came with the Stronks' feedlot. 11:16

At that time I understand I had recently completed their substantial completion report. I was fully aware of what the NRCB requirements were for RCC having just been through that.

So I relayed that information to them. I talked to them about subgrade preparation. I outlined that, you know, once they have their grade achieved, they need to take their compactor and move over it and check the base. And if there was any soft spots, they would need to subexcavate those and reconstruct to make sure 11:16 that the base was solid moving forward.

I had been on site doing my own shallow boreholes, and I had also reviewed the Chilako Drilling reports, and I generally did not have a concern that the subgrade would be an issue. The subgrade there was

well -- reasonably well drained. The site is -- it's on a bit of a hill, if you will. There is significant relief from the site. The soils are -- are structurally suitable for this sort of activity. I knew that. So I didn't have any concern.

Nevertheless, I did discuss the way that the subgrade should be prepared with them at that time.

Help me, Cody.

Q. Can you also talk about some of the other features about the concrete? The curing for example? 11:17

A. MR. LOBBEZOO: Okay, so the curing condition, if you will, that had been placed on the Stronks' was also relayed to the Muilwijks, to Arie Muilwijk and the crew. So I did go over that with them, and they -- I certainly had the understanding that they knew that it needed to be covered with straw, that it needed to be watered.

The pictures that I was provided did show that they put a significant layer of straw on that -- on that RCC pad, more than we had seen at the previous 11:18 installation in fact.

Q. And how about sulphate resistance?

A. MR. LOBBEZOO: Okay. That's a little bit of a topic in its own.

So sulphate resistance is -- the need for sulphate

resistance in concrete stems to the potential for sulphate attack from the soils. So in the CSA, it's Document A23.1. It's the binder, if you will, that outlines all the CSA requirements for concrete. They provide in Table 1 a long list of the different exposure classifications for concrete.

There is a series of A classifications, and they pertain to concrete exposed to manure, manure gases, silage gases, and the likes. With all of those A class concretes, there is no requirement for 11:19
sulphate-resistant cement. Sulphate-resistant cement specific comes into place where concrete is against soils which contain elevated levels of sulphate, and that would be the S class of concrete.

The note in the table also indicates that the concrete can be both an A class and an S class, and that could be considered in this case where concrete is against the soil and the manure. And in that case, it would require sulphate protection.

In Alberta -- in southern Alberta here, most of 11:20
the fine grain soils, the clays and clay tills, contain moderate levels of sulphates, which indicates severe potential for sulphate attack, which, according to the table, indicate that the concrete needs to be certain MPa's to -- and needs to be sulphate-resistant cement.

As the soils turn to coarse grain in southern Alberta, particularly your gravels, the sulphates in the soils are negligible. Here in southern Alberta, because so many of the natural fine grain soils do contain elevated sulphates, almost all of the producers are exclusively using type HS concrete, sulphate-resistant cement.

Q. In the case of the Muilwijk application --

A. In the case --

Q. -- do you know if sulphate-resistant cement was used? 11:21

A. MR. LOBBEZOO: I understand that Prairie Stone, the supplier, uses sulphate-resistant cement for this very reason, and that would be consistent with most of the plants and operators in this area.

Some of the more sophisticated plants are using a -- what -- it's called an HS blend, which is regular cement mixed with flyash and different additives, which they have proved of their own accord that it meets CSA requirements for sulphate-blended cement. That's not the case, as I understand, with Prairie Stone. 11:22

Q. And to confirm, at the Muilwijk site, the concrete supplier was Prairie Stone Concrete?

A. MR. LOBBEZOO: I've been told that the supplier was Prairie Stone, both by the owner of Prairie Stone himself.

Q. Okay.
A. MR. LOBBEZOO: Again, I was not on site to physically see their crew place it.
Q. Okay. And the installation crew was Sub-Terrain Excavation?
A. MR. LOBBEZOO: Sub-Terrain Excavating, I had a phone conversation with their owner who told me that yes, they were engaged to do it and were doing it. Of course I was not on site to physically see that it was them. 11:23
Q. Okay. And the RCC mix design was by Rock Solid Concrete, John Both?
A. MR. LOBBEZOO: I have been -- that's what I have been told, yes.
Q. Okay.
A. MR. LOBBEZOO: And John Both will have to testify to that, of course.
Q. Okay. And so those three suppliers, installation crew, and the RCC mix design are the same people that did the Stronks' application or installation? 11:23
A. MR. LOBBEZOO: Those are the same three that did the Stronks' installation, yes.
Q. Very good, thanks. John, can you talk a little bit about crack control?
A. MR. LOBBEZOO: Sure. My favourite.

So there are different ways to look at crack control. In -- when you look at Exhibit Number -- and we don't need to pull Exhibit 77, but when we look at Category A and B, the concrete which are specifically talking about pits, liquid manure storage pits, these are usually smaller pits, and rebar is included to the extent possible, I suppose, to prevent cracking.

These are small enough structures in many cases where the shrinkage or whatever or the movement associated with shrinkage can be accommodated within 11:24
the tensile resistance and compressive strengths properties of the concrete itself. Where they expect cracks in expansion joints or pit-to-floor joints, they are directed to put water stops of one sort or another.

So in small structures, crack control means let's reinforce the structure to the point where we can try to avoid cracking.

In larger structures, the forces generated by the shrinking, and perhaps expansion, of the concrete are too much to be accommodated by the addition of the 11:25
additional tensile strength provided by rebar.

So large slabs, whether they are reinforced or not, are going to crack. And in fact the total summation of crack widths across the entire slab element for very large slabs is probably going to be

just as much. The only place where it would be less is along the edges where the tensile resistance of the concrete may be able to mobilize a greater drag force and physically drag the slab further across the subgrade from the edge.

Q. Should we use RCC -- should we use saw cuts in RCC to control cracks?

A. MR. LOBBEZOO: Yes. So for slabs, when we talk about crack control, what we're saying is we know it's going to crack, so we want it to crack at specific predetermined locations. So in slabs, crack control means we are going out there to physically saw cut and promote cracking in these predetermined locations.

You can imagine that if you talk about crack control in RCC for a pen floor, and we had out there saw cutting at 5- or 6-metre intervals, that would raise the ire of many. But the reality is that is what crack control means when you're talking with large slabs.

11:26

Q. Okay. So to confirm, solid manure pads that use concrete, traditional plastic concrete, will crack?

11:27

A. MR. LOBBEZOO: Yes. And whether they include rebar or not, the total cracking will generally be similar.

Q. And crack control is just a way we can control the

manner in which those cracks form?

A. MR. LOBBEZOO: That's right.

Q. In a solid manure storage pad, those cracks would ultimately fill with manure also?

A. MR. LOBBEZOO: Yes.

Q. Okay. If we looked at an RCC pad, the cracking would be more at random? Does that make sense?

A. MR. LOBBEZOO: It would be -- are you looking to compare cracking between --

Q. Versus controlled -- would it be controlled cracking or more of a random cracking? 11:28

A. MR. LOBBEZOO: Well, without saw cutting, it would be -- it would be as random as with conventional concrete. If it's conventional concrete that's reinforced, the crack spacing in that conventional concrete, all things being equal, may be further apart than for RCC.

However, there are many other considerations that come into this. Specifically, cracking of RCC -- total cracking in RCC is generally substantially less than 11:28 **conventional concrete. So -- and there are a few reasons for that.**

When you have conventional plastic concrete and you have all this water and liquid and a less dense concrete matrix, as the water -- as the concrete cures,

that initial curing, it shrinks as the water is drawn out of it.

In RCC, because the water content is so low and the mix itself is denser, you don't have that shrinkage, that initial shrinkage like you do with conventional concrete. And that is substantial.

So when it comes to shrinkage cracking or cracking of RCC, and John Both will speak more to this, but in my opinion and from my experience, it appears that the cracking in RCC is predominantly limited to thermal cracking or thermal response to thermal expansion or contraction of the concrete slab itself. 11:29

And when we take -- when we assume a temperature differential, we can predict what that cracking may look like under -- under sort of extreme thermal temperature changes.

In the case of RCC and a temperature differential of 60 degrees, so minus 30 to plus 30, if you will, I had calculated in the previous reports what that cracking was. And I don't have it off the top of my head. I think I calculated 5 millimetres per 10-metre length. 11:30

Q. Okay. But ultimately on a solid manure pad, for RCC installation, we would see some cracking and infilling of those cracks with manure?

A. MR. LOBBEZOO: Yes. Yes. Obviously if there's manure overtop of it and the cattle are walking and trodding over it, it will work its way into the cracks eventually.

Q. Okay. John, I would like to move on to your reports that you submitted. If we would consider your report from October 29th and October or November 6th, the approval officer asked you to modify your October 29th report. What were the changes that he asked you to make? And how did they arrive to you? 11:31

A. MR. LOBBEZOO: So the request came through Mr. Muilwijk, and the feedback that I got through Mr. Muilwijk was that they were very happy with the report that was submitted, that they were looking for specific backup information to the core samples. So they wanted -- when I would say the density of the core was the range that I provided, they wanted to see the individual core densities. They wanted to see the individual thicknesses. That was my understanding through Arie. They wanted those details. 11:32

And then in that October 29 report I had -- I had spent some space in the report, if you will, talking about RCC compared to conventional liners, compacted clay liners, reinforced concrete liners, high density polyethylene liners, steel liners, if you will. And

one of the -- one of the arguments that I made was that when a feedlot has a compacted clay liner, there is no mechanism for, you know, NRCB to follow up after pens are cleaned out and the liner is lost and different material is brought in or the liner just completely disappears.

So my argument was on that basis, the RCC was much, much better. It was much more robust. We know that it lasts. And, you know, in comparison to all these other liners, RCC was probably one of the most favourable liner approaches. 11:33

So the feedback that I got was, well, as an engineer, you actually also supported the construction of those liner approaches. So it may not be so helpful for you to be saying something like that into a public record.

And I read through the lines saying, okay, well, they're spinning it on me, but the NRCB actually does not want that in the public record. They would rather not because that would not be good for business, if you will. 11:34

Q. So just to confirm, the modifications were some additions, but also removal of a couple parts of your report?

A. MR. LOBBEZOO: Yes.

Q. Where you were just asking or bringing to their attention that multiple liner types may have different inspection or repair and maintenance plans?
A. MR. LOBBEZOO: Yeah.
Q. Okay.
A. MR. LOBBEZOO: And the key there really for me was to promote RCC as a favourable alternative to these other -- other liners.
Q. Right. You were just promoting RCC. Okay, very good.
You've really worked on this idea of the calculations and the methodology being missing from that October 29th report. Do you have the calculations available -- 11:35
A. MR. LOBBEZOO: Yes.
Q. -- that you did? And if they would have been asked for, you could have reproduced them -- or produced them?
A. MR. LOBBEZOO: Yes.
Q. When we talk about the Wood report from 8 -- this is the submission that you again supported for the Board review. What was your approach there of that report? 11:35
A. MR. LOBBEZOO: You're referring to the April 8th?
Q. April 8th submission for the Board, you provided some more calculations and some more illustrations. What was the purpose there?

A. MR. LOBBEZOO: In response to the decision where it became apparent that they were looking for the actual calculations, for one, yeah, that was it.

Q. Just to better illustrate the calculations?

A. MR. LOBBEZOO: Yes.

Q. And help us move through this -- the mathematical piece of what the regulations say and how the calculations could be worked out to show how roller compacted concrete can be the liner? Is that accurate?

A. MR. LOBBEZOO: Sure. So the approach that I took initially was -- in essence I was looking at the proportion of RCC relative to the proportion of cracking. So in 100 square metres, what was the area of cracking or what could be the area of cracking and what was the area of RCC. 11:36

Scott -- Mr. Cunningham laid his calculations out yesterday, and my approach -- my initial report was slightly different just in the thought process in that all I was looking for was a proportionate or a composite permeability. 11:37

Mr. Cunningham stepped through how he got to that level through Darcy's equation. Darcy's equation is an equation which allows you to calculate -- well, it's a relationship between quantity of water, if you will, and the coefficient of permeability and the area. And

it includes the -- and Mr. Cunningham talked about the I or the gradient as well.

In this case, the AOPA simply talks about the coefficient of permeability, and that's what I was after, along with the area.

So our thought process to get to that point was slightly different, but the net result was Mr. Cunningham was doing the -- pretty much the exact calculations that I was.

Q. Okay. 11:38

MR. METHERAL: File manager, can we pull up the Wood report from April 8th, Exhibit 98, and page number -- page 2, middle of the page. We want to bring this to the Board's attention.

Q. Mr. Lobbezoo, you've done a calculation here that -- it's the paragraph that says: (as read)

"It is noted..."

At the end of that, in this calculation, you've kind of suggested that -- and I'll try and phrase this, once the con -- RCC is placed on day one, there are no cracks. 11:39

A. MR. LOBBEZOO: Yes.

Q. You worked through the calculation considering crack-free RCC permeability liner thickness. You've given us an estimate of 100 times the AOPA requirements. Does that make sense to you?

A. MR. LOBBEZOO: Yes.
Q. You're comfortable with those calculations. So on day one no cracks, the RCC will be 100 times the requirements for AOPA. But you've taken that a step further; you were asked to address crack control or cracking. So we see this move towards having open cracks or cracks that are growing and infilling with manure and the glading effect as also a barrier. So your calculations do consider cracking?
A. MR. LOBBEZOO: Yes. 11:40
Q. And that would be the next part of your submission and kind of the -- similar in both submissions?
A. MR. LOBBEZOO: Yes.
Q. Can you maybe describe to us the assumption of this glading effect and how a small crack will start to be infilled with organic material?
A. MR. LOBBEZOO: All right. So obviously when you're considering cracking and the permeability through cracking -- document manager, I think you can put this down for now -- there are different 11:40
approaches. And initially I was looking at the permeability of the -- the assumed permeability of the material under the slab, if that material would work up through the crack or somehow get in the crack over the permeability of that and looking at those permeability

numbers. I thought, no, this would be more of a manure approach and how could we look at that. What is glading? Is it actual manure or is it broken down material?

I did defer to this report that Jim Miller and others have done when they explored in southern Alberta permeability through the base of various pens. So I would like to talk about that a little bit.

What was happening was that people were observing that underneath a manure pack in sandy or sites that 11:41
did not meet the AOPA, there was this black layer, this slimy layer, if you will, that the pervading opinion was at that time that this layer was sealing off the soil to prevent groundwater from going down, and that layer, could it, should it be considered as a liner perhaps to meet the regulatory requirements.

So there was testing done on that, and the net result was that it did improve permeability characteristics of the subsurface soils, but not to the point that it could be considered as a liner material 11:42
in and of itself.

That being said, obviously that research was very important. I looked at glading -- and maybe I can discuss a little bit what glading and what they mean with glading.

So glading would be manure, I suppose, that's being worked down and -- but also breaking down through chemical actions. So anaerobic action or different activities that are happening is pretty much turning this manure into what we have observed as this black slime almost. And that's what the report was after. Like does this black slime, this goop, this whatever you want to call it politely, does it -- you know, what are the permeability characteristics of that.

So that study was very important because it actually provides permeability data for broken down, slimy manure, if you will, mixed with sand or silt. 11:43

So in the absence of trying to bring manure into my laboratory and do permeability testing on it, this was the approach that I -- that I deferred to. And the -- in my reports, I provide the range of that. The range is provided as 4 times 10 to the minus 5 to 9 times 10 to the minus 4. So there is a broad range.

When I did the actual calculations, I did end up settling at sort of the midpoint of that range provided. 11:44

Q. Okay. So this glading effect and the sealing of the cracks will help to reduce the flow through those cracks. There's some concern that the cattle might deteriorate that self-sealed area, but we're talking

cracks that are no bigger than 15 mils at max, 15 millimetres at maximum, and hopefully that wouldn't penetrate that. Is that -- would you agree with that statement?

A. MR. LOBBEZOO: Yes. I mean, 15 -- when I initially looked at this, I was -- I kind of took the approach of what's the absolute maximum cracking that you could even ever comprehend, and that's where the 20-millimetre-wide crack in both directions came into play in the -- in the -- in the November 6 submission and the October 29 submission. 11:45

And to clarify, I know this will come up, so let me address why Mr. Cunningham could not reproduce my numbers. The frank reality is that when I was preparing that, there was many drafts that I was going through. The number was provided in error. I had a range of permeabilities. I was looking at a range of cracks that I was working through, and the permeability that I had used for the crack in that case was about half of what was provided in the report. So that's where the discrepancy came. 11:46

And I would just like to talk about that in the context of the importance of engineers dialoguing with other engineers when they run across these problems. I mean, this is laid out in the -- in the ethics document

provided by APEGA for all APEGA members. I have the luxury of working with the past APEGA president in this office and a past member, long-term member of the discipline committee as well.

And so this morning I talked to him about, you know, who is exempt from those requirements. And he was very forthright and said, "That applies to all APEGA members that as a courtesy and as an obligation that when we are reviewing others' work, we -- we inform them of that." And certainly that open dialogue between members can easily resolve these kinds of issues which may arise. 11:47

So that has been quite a discouragement for me, and I just -- as part of my testimony, I think it's important to enter that into the record.

Q. Thanks, John.

We'll move on a little bit here to the idea of RCC failure. I showed some pictures that illustrated large holes and then even moving from bigger cracks and deterioration. We're not talking about that. In your report you would suggest large holes or failures would make -- would not be acceptable? 11:47

A. MR. LOBBEZOO: That's correct. So large failures would be -- would be a maintenance issue and a -- you know, in accordance with good practice, those areas

should be appropriately repaired.

Q. Yes, right. Okay. I would ask you about the -- the last part of your report on the composite calculation.

A. MR. LOBBEZOO: Oh, yes.

Q. So further -- I know in our discussions, there was this -- we would like RCC to stand on its own through this Board hearing.

A. MR. LOBBEZOO: Yes.

Q. But a composite calculation was included in your report. 11:48

A. MR. LOBBEZOO: Yes.

Q. And it just suggested the soil below the site could add some additional protection. So the Board could have a look at that. You're comfortable with that calculation?

A. MR. LOBBEZOO: Yeah, I would like to speak to that just a little bit.

I thought it was important to include that in the April 8th submission, just to outline what the soils were, I suppose, and what, if any, effect that they had on it. 11:49

So the reality is when you're talking about the soil permeability -- and Mr. Cunningham rightly pointed this out yesterday. We are talking about differences in orders of magnitude. If someone says, "Oh, well

that soil is twice as permeable as that soil," if you understand soil permeability, twice as much as -- that's nothing. That's the same. We always talk in almost in orders of magnitude, exponential, right?

So the criteria that the AOPA provides, they are looking for, you know, a certain thickness of material that's 1 times 10 to the minus 6 centimetres per second.

In the case of the natural occurring soils, we are about an order of magnitude higher permeability than what the AOPA is looking for. 11:50

Now, when you reduce that down into what the equivalent thickness is to satisfy the AOPA, I calculated that the equivalent thickness was about 75 millimetres, and that 75 millimetres would be relative to the 0.5 millimetres of the liner thickness indicated by the AOPA.

Q. Okay. So just to clarify, that added a little more protection at Arie's site?

A. MR. LOBBEZOO: That's correct. 11:51

Q. Specifically, though, in your opinion, silty soil, the hydraulic conductivity would range between?

A. MR. LOBBEZOO: At this site, looking at the logs and the published information, the range would be 1 times 10 to the minus 4 centimetres per second to 1

times 10 to the -- 5, minus 5 centimetres per second.

Q. Okay. So on that note, for the Board, when we were looking at the ERST, risk screening tool calculations, we did some correcting, we did correct the water -- or we did do some correcting of the distance to the catch basin. There were some proposed corrections for the depth to water table. Would you be of the opinion that coarse material versus medium material textures should also be addressed?

A. MR. LOBBEZOO: Yes, I do. 11:51

Q. And changing it from a coarse grade to medium would be appropriate for the risk screening?

A. MR. LOBBEZOO: It should be -- it should be a medium. And could we -- maybe we should look at Chilako's drilling information on that?

MR. METHERAL: Yes. Can we pull up the Chilako --

A. MR. LOBBEZOO: Is that Exhibit -- what? 1 or 2, page pdf 8?

MR. METHERAL: I'll find it. 11:52

MS. VANCE: This is Fiona Vance, I might help. In Exhibit 3, it appears in a number of places. I believe page 33 is one of them.

A. MR. LOBBEZOO: Okay, good, thank you.

MS. VANCE: Don't ask me why I know these off

by my heart.

A. MR. LOBBEZOO: You're the best.

THE CHAIR: Thank you, Ms. Vance. Well, we've been at these a few times, so good for you, thank you.

MR. METHERAL: Can you zoom in a little bit? Trial manager, thank you. Zoom in a bit.

A. MR. LOBBEZOO: Okay, thank you.

So if you look at the texture, the way the texture is listed. And, file manager, on the bottom of the page, if you could just scroll down there, just -- oh, it's not on this one. Yeah, keep going, please. Yes. Keep going, keep going. No, keep going. There we go. 11:53

The L in the legend is key here, loam. So we have L, C, S, GR, SI, F, and VF.

So if we scroll back to the top of this table, please. Yes. So when Mr. Cunningham was discussing the soil texture here, he was omitting the L in each case. So -- and this is important, and I'll explain.

There are various ways to classify soils. And if you're familiar with the geotechnical world, you'll know that geotechnical engineers have argued and debated forever on how we classify soils. 11:54

So they came up with a unified system, and that wasn't good enough, so now we call it the modified unified system. And we're not sure if it's the

modified-modified unified system, but it certainly is not very unified.

In this case, this doesn't meet any of those. This is a -- this is an approach, a texture classification that you would see in documents like Alberta Environment's code of practice for septic field design.

In the geotechnical world, we would call this a more agrology-type approach, where you would describe things in terms of loam. And simply what loam is 11:55
referring to is this -- this blended material.

So when you would say very fine sand on the very top line, sand loam, you're saying that we're very fine sand, but we're on the siltiest side of that sand or we're heading toward the clay side. We're not really sand; we have a fair amount of silt in it.

So if you go through all of these things, you see loam on all of them, which pushes it into the siltier material zones.

So while Mr. Cunningham said that the remarks are 11:55
only a bit of a descriptor relative to the actual texture, when you look at, say, that first line, very fine sand loam and then he writes "silty" on it, the person doing the log here is suggesting that this is as far to the edge of what he could call very fine sand

loam, because beyond that, it would be a silt loam, say. But he wasn't comfortable calling it a silt loam, so he carried it as a fine sand but with a descriptor.

So when you compare that to the table -- this says page 91 on it.

MR. METHERAL: Can we scroll down to -- to see if it's --

A. MR. LOBBEZOO: Is it page 91 of this document?

MR. METHERAL: The ERSTs.

A. MR. LOBBEZOO: Yeah, file manager, Number 91 if it's the same -- oh, beautiful. Thanks. 11:56

So when we see silt and silty sand here, we are -- we are certainly pushed right to the left side of where it would say silty sand, and we would be more in the silt zone.

When I compare the Chilako logs to my other -- my own information, it does put me exactly in the range of where it says 10 to the minus 4 to 10 to the minus 5, right in that range.

So it would be my opinion, as a geotechnical engineer, that the soils there would be appropriately classified as medium texture. 11:57

And you can take that down now, Mr. Document Manager. Thank you.

Q. Thanks, Mr. Lobbezoo. Do you have anything else you'd

like to add on this discussion?

A. MR. LOBBEZOO: Okay. There was -- it seems to me that a lot of the submissions that were provided in the -- the attempt was to cast doubt on RCC. And the one thing that stands out more than about anything else is this idea that RCC actually is so pervious that we should use this and people are using this in parking lots to facilitate drainage from the surface down through the concrete matrix and out through the subgrade. And yes, that is a practice in other 11:58
jurisdictions, particularly in southern climates where frost heaving and related is not an issue.

What I would like to point out is that that can be accommodated by the gradation of the material, where you have coarse aggregate and you have minimal to almost no fines but just enough cement paste to bond the edges of the coarse aggregates together, thereby creating this porous matrix. And what you would see in that matrix, in terms of relative density, is something that's of a much lower density than you would for a 11:59
non-porous RCC matrix.

So, for instance, the range of density for a porous RCC would be in the range of about 1550 kilograms per metre cubed to possibly 1850 kilograms per metre cubed.

In our reports, our density results, we used a target density of 2400 kilograms per cubic metre. That density -- so you can see that the two densities are very different from one to the other. They're not even close.

To expand on the density of the concrete, if you look at conventional concrete, the density of conventional concrete ranges from about 2250 kilograms per cubic metre for air-entrained concrete to about 2350, maybe 2400 at the high end, for non-air-entrained conventional concrete. 12:00

In the case of our compacted concrete matrix, yeah, we see design densities in that 2400 range, which is generally at the extreme upper limit or higher than conventional concrete. And the testing results at the Muilwijks' demonstrated that this is the zone that we are in.

Also, as far as the target density of 2400, yes, I took that as an assumed density for this RCC mix. This is very typical. So when you would say that something is compacted to 101 percent, that means that in the field, they actually were able to exert more effort than we would in a design situation, than our target design. So that's why you see densities are higher than the target. 12:01

With more effort, yes, you could even -- you can achieve higher densities. So I just wanted to clarify that that is why we see slightly high densities, higher than 100.

Q. Very good. Thank you, Mr. Lobbezoo, for your testimony.

THE CHAIR: Mr. Metheral, you just might have to move the mic sort of towards you just so we can hear you.

MR. METHERAL: We would like to thank Mr. Lobbezoo for his testimony. 12:02

THE CHAIR: Much better. So you and Mr. Both, and that's your last direct, then, with Mr. Both?

MR. METHERAL: Yes.

THE CHAIR: So how long do you think you'll be with Mr. Both, do you know?

MR. METHERAL: My question list is quite a bit shorter.

THE CHAIR: Okay.

MR. METHERAL: 20 minutes. 12:02

THE CHAIR: Okay, perfect. We can do that after break, though, I think. Let's break for 45 minutes, so that will be 12:45, come back at 12:45. That's a bit shorter, but if that works for everyone, and we can wrap up after that, because we'll need to

obviously move to questions from field services and Board Panel and staff.

Okay, thank you very much. We'll see you at 12:45.

MR. METHERAL: Thank you.

(PROCEEDINGS ADJOURNED AT 12:03 P.M.)

PROCEEDINGS ADJOURNED TO 12:45 P.M.

Volume 2
April 21, 2021
P.M. Session

(PROCEEDINGS RESUMED AT 12:47 P.M.)

THE CHAIR: Just a quick prelim. I was asked by a Panel member if we have Mr. Lobbezoo's CV on hand. Has that been submitted already? And if not, can it be?

MR. METHERAL: Yes, we can get you a CV. I don't know if it has been submitted yet. Sorry, it hasn't. 12:47

THE CHAIR: Okay, thank you. I'm not sure if you have it handy electronically. You could just send it to Ms. Friend and get it in as an exhibit later on, but if it's handy. Okay, thank you.

Okay. So Mr. Metheral and Mr. Both.

C. METHERAL, A. MUILWIJK, J. LOBBEZOO, J. BOTH (For Arie and Willemina Muilwijk), previously sworn/affirmed

MR. METHERAL EXAMINES THE PANEL: 12:48

MR. METHERAL: Yes, thanks, Mr. Chair.

Q. Mr. Both, are you there?

A. MR. BOTH: I'm here, yes.

Q. Very good. Thanks for joining us from Athabasca. Is that correct?

A. MR. BOTH: That's correct. My pleasure.

Q. If we could start with your education and experience related to roller compacted concrete -- concrete and roller compacted concrete, that would be great?

A. MR. BOTH: Sure.

My name is John Both. I'm a certified engineering technologist with ASET here registered in Alberta. I began working with concrete in 1984, full time in 1988.

In 1992 I moved to the oil and gas industry, and then again back into the -- full-time in the concrete industry in early 2010, where I was the founder of -- one of the founders of Rock Solid Concrete Products. 12:48

I began working with roller compacted concrete in 2012 through experimental purposes, developing new technology for the manufacturing of it. And I went on to installation in multiple different applications.

In the organization that I lead, I'm involved in the designing and the application of concrete in many different industries, including the agriculture industry. 12:49

Q. Do you have any experience in the regulatory environment, working with regulators?

A. MR. BOTH: I do, working with regulators. I have been involved -- Alberta Agricultural has brought me into a couple of discussions with respect to roller

compacted concrete in feedlot applications. I am currently working on a project in Oregon, worked with the regulator there to have a large application as a liner approved. That project will be starting in two weeks; it's 115 acres, where it's roller compacted concrete will be used as a liner. I did the design for that -- for that approval with that regulator. That is both for wet and dry manure storage locations.

And I'm also involved in about six other locations in the midwest in the United States working with 12:50
regulators to get this product approved in those locations as well.

Q. Very good. Can we talk about your report now?

MR. METHERAL: File manager, that's Number 97.

Q. Yes, can you give us a little bit of summary of what you've identified here for the Board?

A. MR. BOTH: My intent with this report was to demonstrate the predictability of cracks -- shrinkage-related cracks within concrete and to make the statement that roller compacted concrete and 12:51
regular concrete perform very similarly.

My intention was to demonstrate a few of the summary points that as shrinkage cracks get further apart, the distance -- the space of those cracks will be wider, the crack thickness will be wider. The

reason is, is because we need to have a total amount of shrinkage -- or there's an assumed total amount of shrinkage within that area of that concrete, as Mr. Lobbezoo has already referred to.

I wanted to demonstrate that cracking was due to mass loss, so mass loss due to chemical change taking place within the hydration reaction that's taken place within the concrete and the loss of moisture as the excess moisture is leaving the concrete.

And then I wanted to also demonstrate when cracking should be anticipated and how much cracking should be anticipated as its early life versus later in its life and then to correlate that with the strength of concrete. There's a misconception that stronger concrete means less cracking. Stronger concrete doesn't necessarily mean less shrinkage cracking. The stronger the concrete, typically the going through calculations will indicate a larger degree of cracking as you can see on the tables that I presented. 12:52

Q. Very good. So can you maybe just point or hint on the -- what would be traditional plastic concrete and the differences between traditional plastic concrete and roller compacted concrete? 12:52

A. MR. BOTH: I sure can. As I stated, the shrinkage of concrete is dependent on two factors. All

of it is actually considered the paste coefficient. The paste coefficient is made up of the cement, the water. Those -- that coefficient is what determines the amount of shrinkage that we're going to have. The reason is, is because all of the other product that's within the concrete is aggregate. The aggregate is not shrinking; the aggregate remains the same size. It's not decreasing in volume as concrete is going from early age to older age.

When we look at typical wet-set normal Portland Cement concrete that we're referring to as "normal concrete," that higher slump concrete, it has a higher paste coefficient. And what that means that it has a higher cement content. Often compared to the product that we're talking about here, we can see 40 percent more cement in it, which means that we'll have approximately 40 percent more water in it as well, which would increase the amount of shrinkage by nearly 40 percent because those are the components that are going to reduce in volume. 12:53 12:53

Q. Very good. And there's been some discussion about concrete density and perhaps this idea that roller compacted concrete can have higher density than traditional concrete. Can you comment on that?

A. MR. BOTH: I sure can. Yeah.

So when we're looking at regular concrete, it has as broad of definition as roller compacted concrete does. When we look at typical higher slump concrete, we would make a -- we would make a -- we would be presuming that we're dealing with a constant density. But in fact, very much as was mentioned with what we would call pervious concrete, pervious concrete has been installed with vibratory forces, much like roller compacted concrete, but it can also be installed by increasing the slump of it, increasing the cement and 12:54
the water content, to the point where it can be screeded into place and vibrated into place as well.

So when we're considering the density of both of these products, it does -- it really depends on the materials that we're using and the performance requirements that are needed.

So if we're looking at a regular normal concrete, the density will -- the materials and the way that we design the mix design will determine what the final density is. And the density somewhat will be 12:55
determined by what the performance requirements are.

That's the same thing for roller compacted concrete. When we know what a performance requirement is, in other words if we're looking for a low permeability, we want to obviously increase the

density. We want to decrease the air void structure within that and decrease the pathways in which water can flow. So density becomes important for that same reason in regular concretes than it does in roller compacted concrete.

Q. Thank you. Is reinforcing in concrete the solution to crack control?

A. MR. BOTH: Reinforcing has two purposes within concrete. If we look at a very typical approach to concrete, if we look at two structures, and I'll just use my hand to demonstrate, if we're looking at, say, a beam that's sitting on two posts on the outside, that beam is sitting on the two posts where my elbows are there, the concrete doesn't have a great flexile or tensile strength. And so when we've got forces in the centre, it wants to split apart. 12:56

When we put rebar in the centre of it, the rebar is holding it; when we put a downward force, it goes into tension. Rebar reinforcing is typically used for that purpose, to add structure to the concrete if it's being used as a structural element. 12:56

When we use reinforcing within concrete on slab on grade, so where the grade is supporting the concrete, all of the load that's applied to the surface is being transferred through the concrete, down through to the

grade. And if a grade is designed as it should be, the grade is capable of supporting all of that load.

The reinforcing, therefore, is installed for crack control, as a portion of crack control. It's designed to increase -- sorry, to decrease the crack frequency, which means it's going to increase the distance between cracks is what it's purposed to do.

But a properly designed slab would have the reinforcing stopping at each crack control location. We're still going to have cracking regardless of whether there's reinforcing in it or not. The concrete is still going to lose mass, it's still going to lose volume. As it loses that volume, it's going to shrink; as it shrinks, it's going to want to separate. 12:57

The idea is to tell it where to crack, not to prevent it from cracking. When we're using reinforcing properly on a slab on grade such as that, we would stop the reinforcing at those crack locations, and we would install dowels. And those dowels would be installed in such a way that it would promote movement at those locations. 12:57

So when we look at reinforcing on that slab on grade, just to summarize that, it will serve only to -- it will serve only to identify or to direct the cracks to certain locations. But reinforcing will not stop --

well, I shouldn't say will not. It typically will not stop cracking, depending on the size of the slab.

So if we have a smaller slab and a slab that's, say, 5 metres by 5 metres, if we put reinforcing in that, that will help to ensure we have no cracking within that small slab because that reinforcing is providing enough tensile strength to allow the outside edges to be drawn together. And so the centre portion will not need to separate.

But if we magnify that and we go by a factor of 10, or even we go to, say, 30 metres by 30 metres, I'll use that example, if we think that we're going to use reinforcing to allow all of that concrete to be drawn to the centre, we have to realize -- and if you look at one of the tables that I have, it can be assumed that we would have over 30 metres and .00 -- so .5 percent. We would have over 30 metres, we would have 15 centimetres of cracking. I'm sorry, 15 millimetres of cracking. 12:58

But we have to realize that we've got 340 tonnes -- 340 tonnes of concrete sitting on the ground, and it would need to draw in that 340 tonnes of concrete with the frictional load of the ground below it. So it's -- and that would have to happen in its early stages. Concrete begins to shrink right after 12:59

the final set time. So concrete is just becoming rigid, it's losing its plastic characteristics. It's now become rigid, which means that it's no longer plastic. As the concrete is shrinking, it's trying to pull itself together, but this is at its weakest point in time, so it doesn't have the tensile strength to be able to hold itself together.

That's where the rebar has the tendency to try and help that, but it can only help it to a certain degree. It will not allow it to be able to pull that full 13:00
distance of 30 metres, for instance, because the weight sitting on top of that ground, it won't be able to transfer that tensile force, it won't be able to carry that tensile force, unless there's so much rebar in it, and I haven't done the math on it, but I could if you would ask me to, but we would need a lot of rebar, a lot more than what we see in the guidelines from NRCB.

Q. Great. Okay. There's been some uncertainty around the use of a Schmidt hammer and Schmidt hammer testing. Can you maybe comment on your experience with that 13:00
tool?

A. MR. BOTH: Sure. I have used a Schmidt hammer in many applications. I've used it on normal -- we'll use that term, normal wet set concrete. I've used it in different textures of that concrete

where I've done testing on it, we have our own in-house lab as well. In our lab, we have tested samples of the concrete comparative to the Schmidt hammer, and what my conclusion is time and time again, if the surface is not smooth, we will see a reduction in readings time and time again.

When we look at roller compacted concrete, I've used a Schmidt hammer on roller compacted concrete in many applications as well, I've done hundreds and hundreds and hundreds of tests using a Schmidt hammer; we're seeing the same thing. If you are looking at the surface and if you pick a very porous area of that surface, you will find that that will read low. And if you do a core sample of that, you will find that that core sample is actually reading higher than what the Schmidt hammer is showing. 13:01

Q. Okay. Some of the uncertainty was around calibration and specifically, you know, in a field application.

A. MR. BOTH: Sure.

Q. Any thoughts there? 13:01

A. MR. BOTH: Yeah. Calibration is beneficial. Typically a user of the Schmidt hammer will have experience within their geographical region.

Often if we're using similar aggregates, we'll be getting similar results. Close -- I mean, a

Schmidt hammer is not designed to give us a precision; it's given us a pretty good -- a pretty good idea, a pretty good ballpark of where we're at. The number I typically carry in my mind is a plus or minus 10 percent. Usually it's a little bit better than that.

But the calibration is important if we want to be very precise. And it can be quite precise. Calibration would mean that we would use the hammer on a known concrete -- on a chunk of concrete that we -- that we have already done a compressive test to ensure that it's reading similarly. But my experience has been that the Schmidt hammer -- the recordings on it are quite close again, but plus or minus that 10 percent.

13:02

Q. Okay. Would a Schmidt hammer, if you were using it in the field, give you low readings on poor concrete, perhaps right beside -- in the case of roller compacted concrete, would it give you lower readings if you found some poor RCC?

13:03

A. **MR. BOTH: Absolutely, for sure it would give you a low reading.**

It is -- it's really -- if we look at the principle of it, it's a loaded spring that's pushing a pin into the concrete. And it's the further that that

pin is driven in indicates the strength of that concrete. You would be able to -- if that concrete is weaker, every single time you will see it. Yes.

Q. Great, thank you. And we were -- also had some questions about Arie's -- Mr. Muilwijk's site. We were trying to verify if Rock Solid did the RCC mix for the site?

A. MR. BOTH: The answer is yes. Yeah, we did the mix on that. I was actually the one who put together the mix design for the project. 13:04

Q. Okay. And you're familiar with Prairie Stone Concrete?

A. MR. BOTH: Yes.

Q. And their installation?

A. MR. BOTH: Yes. Sorry.

Q. Yes, and their installation crew Sub-Terrain?

A. MR. BOTH: Correct. So Prairie Stone Concrete, we supply technical support for Prairie Stone Concrete; we have since their inception. The RCC side of things, we do collaborate with them as a sister company. I have to use that term very loosely. They 13:04 **own all of their own operations; we simply support them because they use similar technology to what we're using. That's why we call them a sister company, because we're using the same technology. We supply all the -- much of the technical support. Wood Engineering**

supplies technical support, and we supply technical support for the applications such as roller compacted concrete and their mix designs.

As far as the installation goes, Sub-Terrain had done the installation. We had worked on projects with Sub-Terrain prior to this project. And some of the larger projects that had been done within the province, we were supplying the concrete, and Sub-Terrain was doing the installation. And I was personally on site with Sub-Terrain on those projects. 13:05

Q. Right. And you were part of the first -- the Stronks' site where the first RCC pad was approved and installed?

A. MR. BOTH: Can you repeat the question, sorry?

THE COURT REPORTER: Sorry, this is Donna, the court reporter. Mr. Both, can you please slow down a bit? You're speaking a bit too fast.

A. MR. BOTH: My apologies.

THE COURT REPORTER: Thank you. 13:05

THE CHAIR: Thanks, Ms. Gerbrandt. I should have interjected earlier, sorry, good for you. Thanks, Mr. Both.

Q. MR. METHERAL: Yes, just to confirm, Mr. Both, were you part of the roller compacted concrete at

Stronks' feedlot?

A. MR. BOTH: Only in the mix design development.

Q. Great. Thank you. Finally, is it possible to determine if concrete at Arie's site meets the certain -- meets a certain spec?

A. MR. BOTH: It is. The wonderful thing about concrete is the material is very provable. It is the most used man-made material on the planet. It is the best understood man-made material on the planet as well. And that means that there is plenty of empirical testing methods that we can use.

Some of the questions that have been raised are in respect to the base performance, how was the base installed and was it correct.

One of the things that we can tell with roller compacted concrete is how well that base was prepared. One of the ways that we can know how well that base is prepared, by measuring the density of the concrete.

13:06

If the base has not been prepared properly, if we try to compact that concrete using rollers and you try and compact that on a soft area, we will not get the density. If the base is not at full density, the surface is not going to be at full density, the concrete is not going to be at full density.

13:07

So we can understand how the base is performing simply by determining the density of the concrete.

We can also measure the strength of the concrete. The strength of concrete can be measured in one way: Using a Schmidt hammer, an impact hammer. That will tell us a fairly good -- give us a fairly good indication of what that concrete strength is. We can take core samples and determine the density and also the comprehensive strength if that is --

THE CHAIR: Mr. Both, sorry to interrupt. 13:07
You're still a little quick. I just want to check with Ms. Gerbrandt. I mean we've got to cut her a little bit of slack here. It's a tough job.

So Ms. Gerbrandt, would you like him to slow down just a little bit more?

THE COURT REPORTER: I'm doing okay, but a little slower would help. Yes, thank you.

THE CHAIR: Thank you, all right. Thanks, Mr. Both.

A. MR. BOTH: And I welcome the correction, so 13:08
thank you for that.

And so we can take compressive cylinders, we can drill cores, and we can check the compressive capability of that concrete to determine if it meets the expectation.

We can also determine if we have had curing practices. If we don't have proper curing practices -- and for those that are unfamiliar with curing practices, curing practices are designed to ensure the environment of the concrete is positive and ensures good proper chemical reaction hydration.

For example, if the concrete is allowed to dry out, that means that excess moisture is evaporating. If that excess moisture evaporates, there's no more moisture to hydrate, to continue the chemical reaction with the cement drains. 13:09

So curing will ensure that we've got a -- we have sufficient moisture present for hydration.

Curing also ensures proper temperatures. We want to make sure that the temperatures are positive and that we're in a temperature environment where that chemical reaction can continue. The lower the temperature, the slower the reaction with concrete.

So curing is ensuring that the environment is there. 13:09

We can ensure that the curing environment was correct by simply looking at the final product. We're looking for a compressive strength, we're looking for a density. Both of those can be measured from that concrete. The density needs to be drilled and cored in

order to determine its density, but compressive strength can be measured with non-destructive testing.

If we didn't have proper curing practices, it would be very predictable that we would not be meeting the performance criteria of the project. So if we're meeting the project performance criteria, we should be able to determine through the performance of that product whether we met that project expectation.

Q. MR. METHERAL: Thank you. Is there -- do you have a feel for when a poor quality roller compacted concrete would first show itself? Would degrading cause failure? 13:10

A. MR. BOTH: Yes, I do. And I wish I -- it would be so much nicer if I could say no to that. But as a concrete producer --

Q. Sorry.

A. MR. BOTH: What's that, I'm sorry, Cody?

MR. METHERAL: File manager, can you close that screen down for us?

Q. Go ahead, John. 13:10

A. MR. BOTH: Yes. So as far as when we would -- when is it predictable that we would see failures within roller compacted concrete. Being a producer and installer of the product or -- and being responsible for many projects that have occurred across

the province and beyond our borders, it is very predictable when almost 100 percent of the time we're seeing a failure within the first two years. And most times it's within the first year. That failure becomes very visible.

So typically those failures are identified by pen riders long before the area is cleaned. They start seeing it as a sunken area or they start seeing it as a dark area when the manure starts to dry because it's holding more moisture. 13:11

So it is very predictable to be able to see that. And that is on controlled joints, construction joints, and on -- and open areas. All of those areas become quite visible.

Q. Okay. And then after two years, if we were to -- if you were to consider some sort of maintenance inspection piece, would you say an annual, every 5 years, 10 years, 30 years? What would be an inspection schedule you would recommend?

A. MR. BOTH: Well, I think it should be based on the performance of the liner. So if it's a high-risk liner or a liner that's prone to failure, it should be inspected more frequently. That's an opinion. 13:12

If it's a liner that's known to fail more

frequently, then it should be inspected at a higher frequency.

If we've inspected the roller compacted concrete at a two-year interval and we're seeing no failure, knowing that the design that's being used -- and I've done the calculations for the design at 6 inches thick or 150 millimetres thick at the specification that we saw at Stronks, given the loads that's on there, that's over 20-year design life on that. And when we say a 20-year design life, what we're meaning is the usability of that product exceeds 20 years before typical maintenance practices should begin. It doesn't mean that it's exhausted its life expectancy; that means that that's when we should be predicting that we should start doing maintenance. 13:13

So 2 years and then 20 years really, my thoughts on it.

Q. Okay, sorry, you brought up a key point. I forgot to ask you about your predictions in your report on cracking. 13:13

A. MR. BOTH: Okay. And do you want to define that a little better for me, Cody?

Q. Please, and how it perhaps reflects with John's.

A. MR. BOTH: Oh, so the predictability of the cracking, when we look at -- back to my report. That's

Item Number 97, and we go to page 3 and 4. Scroll down, please, document manager. Thank you. We can stop there.

What we see is calculations for shrinkage, predicted shrinkage over the course of time. We see day 28, it would be calculated for .025 percent shrinkage. We see three different -- starting with the third column, we see 3 metres between cracks. We see a crack width of presumably .41 millimetres, and to the last column, 1.65 millimetres. 13:14

That is dependent on the crack spacing. Again, it just proves that the further apart the cracks are, the wider the cracks are. If the cracks are closer together, we would expect that those cracks to be narrower, to be smaller.

As we go on to 365 days, we will see a percentage of crack of .037. That's one year. We move to the ten-year, we see that going to .044 percent, and then 20 years, .05 percent.

Conclusion is the vast majority of cracking occurs 13:15 in the first year and that when we look at those percentage of crackings, .05 percent would be a 25 MPa.

If we look at the next page, into Table 2, if we were to go to a 40 MPa concrete, we can see those numbers increase from a .05 percent -- and I'm rounding

numbers -- a .05 percent to 20 years at .085 percent.

Q. Thank you. John, do you have any additions?

A. MR. BOTH: No.

Q. Thank you for your testimony, John.

A. MR. BOTH: Thank you.

MR. METHERAL: Mr. Chair, this would include [verbatim] our submissions for the evidence from the Muilwijks.

THE CHAIR: Okay. Well, thank you very much. Thank you, Mr. Both. Thank you, Mr. Metheral. 13:16

We can move to questions. However, I was sort of -- I was just reading a text, and Mr. Graham may be disconnected. It may be an issue in the entire town, a cell tower down or something.

So, Mr. Graham, are you there? It doesn't appear so.

MR. WIEBE: I just received a text message from him, and he can hear the audio clear right now.

THE CHAIR: Okay. Perhaps while you're asking questions -- well, field services would be up first, 13:17 but we need to try to get a text -- sorry, folks, a little bit of admin here. But if Bill or somebody could send Mr. Graham a text and if he has questions he's thinking about, if he can get them in perhaps on a text if that's the only way. But at least he can hear

what we're saying, so that's helpful.

Mr. Kennedy?

MR. KENNEDY: Yeah, he appears to be on at the moment.

THE CHAIR: Oh, okay. Maybe he can hear me now, then.

MR. KENNEDY: I'm just looking at the participants, and he's on. His microphone was open; now it's muted.

THE CHAIR: Okay. 13:17

MR. KENNEDY: But he doesn't -- we can't see his picture, and I assume that he cannot see the -- you know, doesn't have the screen up in front of him.

MR. GRAHAM: Yes, I do. Yes, I don't know what's going on, but it comes and goes.

THE CHAIR: Okay. If you do have questions, Mr. Graham, maybe you could -- you know what, you can ask them when we come up. And if you -- if your audio isn't working, maybe just a quick text or something or a phone call and we'll just relate it. It's a bit 13:18 tricky, but let's just get this completed.

MR. GRAHAM: Okay.

THE CHAIR: Okay, thank you.

MS. FRIEND: Mr. Chair.

THE CHAIR: Yes.

MS. FRIEND: This is Laura, and I have received an email from John Lobbezoo with his one-page CV, if that's sufficient, or he could send a more detailed one in later, or we could add this CV to the record.

THE CHAIR: Let's add the CV now, and he could send a more detailed one. If there's no objections, we could add that even after the fact. I don't think it should be that problematic, but at least if we have a one-pager now.

Ms. Vance, Mr. Metheral, any objections? 13:18

MS. VANCE: I wouldn't mind seeing the one-pager before it's entered as an exhibit, if he could please email that to me as well.

THE CHAIR: All right. Send it to Ms. Vance so she can review, please. Thanks.

MS. FRIEND: Okay, I'll send that on in case he doesn't have her email.

MS. VANCE: Thank you, Laura.

THE CHAIR: Okay, Ms. Vance?

MS. VANCE: Yes. 13:19

MS. VANCE CROSS-EXAMINES THE PANEL:

Q. So probably, just so that the Panel sort of knows what's coming, I'm planning to ask questions in the order of Mr. Muilwijk, Mr. Metheral, Mr. Lobbezoo, and Mr. Both just because that's the order you -- almost

the order that you presented your evidence in. However, if there is a question that is begging to be answered by somebody else, please go ahead and answer that.

So I wonder if I could ask Mr. Muilwijk some questions first.

I wonder if we could just start with Exhibit 28. And Exhibit 28 I believe is the Part 2 application that's part of the record. That page is fine. Thank you. 13:20

So on this page, about a third of the way down, that's your signature; correct? No, back up. Thanks.

A. MR. MUILWIJK: Yes, correct.

Q. And when you -- and you're aware -- okay, I'll just leave it at that. You signed that page. Did you read the text above it in yellow before you signed it?

A. MR. MUILWIJK: I can't read it from here. Could you maybe -- yes, I have read that.

Q. Okay, we're done with that one. That was dated October 1st, 2019. You'll agree that that's 13:21 approximately six-ish weeks before the RCC was actually laid at your site; correct?

A. MR. MUILWIJK: Yes, correct.

Q. Thank you. My questioning is maybe not as organized as I would really like, but let's move to Exhibit 3,

please, pdf page 39. Okay. And if you could kindly scroll down a little. Thank you.

So I believe on other pages, and we can scroll up if you need to see them, there's pictures of straw laid over parts of the site. So my question relates to the bottom right-hand picture, which appears to be, and obviously correct me if I'm wrong, this is when the covered pen was being constructed; is that right?

A. MR. MUILWIJK: Yes, correct.

Q. And was there straw laid on the covered pen at the same time as the other parts of the site? 13:22

A. MR. MUILWIJK: Yes.

Q. And for all the site, was the straw watered down?

A. MR. MUILWIJK: Yes.

Q. Thank you. Exhibit 4, please, page 713. So this is the RFR. This one I think has got your name on it, Mr. Muilwijk, this part of it. And on this page under heading 11, under "Additional Notes For Consideration," you've written that: (as read)

"Prairie Stone concrete had RCC samples taken off the plant and sent to the lab for compressive strength testing." 09:19

And then you said that Mr. Bremer would send the results when they were ready. Do you have those results?

A. MR. MUILWIJK: Yes, now I do.

Q. Oh. Would you be willing to provide those to the Board for this hearing?

A. MR. MUILWIJK: Yes, I just received them yesterday. If you're willing to know the results, we're willing to send them in.

MS. VANCE: Well, I just feel like that might be helpful to resolving some of our questions, and I do not want to extend this hearing. So I ask Mr. Kennedy what the proprietary part of that would be, but I guess -- 13:23

MR. KENNEDY: If you're asking me if we could get an undertaking from Mr. Muilwijk to provide that information, and if he can provide it while the hearing is still ongoing, that would be most helpful.

Q. MS. VANCE: So I think if you could get somebody to email it or email it yourself; you can't obviously while you're testifying.

THE CHAIR: It's really not the opportunity. Mr. Both, I will accept a quick question, but this is not really the time. But go ahead real quickly. 13:24

A. MR. BOTH: Is it appropriate for me to email those results in?

THE CHAIR: I see. Yeah, but, I guess, you know, it's nice to have them at the hearing. But I'll weigh in now.

I mean, none of us have had a chance to review them. So I guess to the extent that we may make some conclusions on those or questions today, but we're sort of got past that as an undertaking. I think the Board is prepared to review them. I think we can figure it out, and we can likely use that in our deliberations.

But I guess as you, Ms. Vance, were wanting to see a one-page CV before accepting this exhibit, I'm a little anxious about us now getting into a protracted debate on these results or discussion when none of us have reviewed the results. 13:24

So you can send them in, but I guess to the extent that they can be used today, I'm not clear on that yet. Thank you.

MS. VANCE: Mr. Chair, I take your point, and it's a very good one. I would like nothing more than to ask questions about it, but obviously if Mr. Muilwijk just got it, we can't do that.

So I will leave that alone. There may be some other -- well, there might be other undertakings as well, so this might be a bit of a dangerous path. 13:25

But just to recap --

THE CHAIR: We had that -- so we have that. I think do we have that marked? Let's mark that as 1. Let's keep track of it for now.

UNDERTAKING - TO PROVIDE THE COMPRESSIVE STRENGTH TEST RESULTS RECEIVED FROM PRAIRIE STONE

THE CHAIR: Go ahead, sorry.

Q. MS. VANCE: So your evidence is you did not have these -- your under -- did you understand that these RCC samples were taken at the time of installation?

A. MR. MUILWIJK: Yes.

Q. Okay. And you just got them yesterday? 13:25

A. MR. MUILWIJK: Yes. So I had asked -- I had asked Mr. Bremer at the time of the -- basically when I wrote this document is when I had asked him for it, and he was going to work on it.

And then I -- when we were going through it all yesterday, I remembered I never received the -- I never received the documents concerning these samples.

So then I texted him, and he sent them to me yesterday so...

Q. Okay. There's nothing I can do about the timing of that. But you did not provide these samples, obviously, to the approval officer prior to January 2021? 13:26

A. MR. MUILWIJK: No.

Q. And Exhibit 4, page 6, so that would be the prior page,

under heading 6, this is about base preparation: (as read)

"Sub-Terrain Excavating used laser-guided dozers to dig out the corrals to the correct slope and grade."

Did you get any documents from Sub-Terrain Excavating to this effect?

A. MR. MUILWIJK: No.

Q. Mr. Muilwijk, in your testimony today, you were talking about the number of reports that you felt you had to obtain from Mr. Lobbezoo as an engineer. When you met with Mr. Cumming on November 4th, 2020, at the site visit, did you have an opportunity to discuss the October 29th report? 13:27

A. MR. MUILWIJK: Yes, we talked about it.

Q. And you'll agree that it was your choice to have Mr. Lobbezoo revise and submit a new report?

A. MR. MUILWIJK: Yes, under Mr. Cumming's effort. He basically asked could you -- could you re -- revise this document. And it was up to me, but he is the one who brought it forward, like "Can you please do this?" And I said, "Sure, I will do that." 13:27

Q. Okay. As recently as -- and we can take this document down. Thank you.

As recently as November 17, 2020, didn't you make

amendments to your permit application? And we can bring up a document if that would assist.

A. MR. MUILWIJK: As of which date, sorry?

Q. November 17th of 2020.

A. MR. MUILWIJK: The only changes that we made would have been the catch basin size, I believe, and --

Q. And perhaps the lagoon between --

A. MR. MUILWIJK: Yes. Because on the site visit, they thought it might also I guess be better if we take that out, and it might also be beneficial for the permit as well, just -- I'm adding a catch basin, but if we also get rid of one that we're not using anymore, it might just -- it looks better. 13:28

Q. Okay, thank you, those are my questions for you.

Mr. Metheral, I have a few for you. You provided -- you provided the Board with I would say four parts of the presentation. So there were sort of three PowerPoints and one video; yes?

A. MR. METHERAL: Yes.

Q. And confirm for me that the only portion of those presentations that actually contained photographs from the Muilwijk site was Part 2; is that right? 13:29

A. MR. METHERAL: We should confirm. The one presentation that is completely Muilwijks' illustrates his yard and barns and corrals.

Q. And just for clarity on the record, is that Exhibit 100, labelled as RCC Part 2 maybe?
A. MR. METHERAL: I think it's part 3. Can we have the document manager pull it up?
Q. So this is part 3. This is Exhibit 101.
A. MR. METHERAL: Sorry, you're right. It would be Part 2 then.
Q. Okay. So Part 2 was the only one of all the photos that you showed us in evidence that were actually from the Muilwijk site? 13:30
A. MR. METHERAL: Yes, Part 2.
Q. And where were the rest of the photos from?
A. MR. METHERAL: The rest of the photos are from my historic work, both at Alberta Agriculture, and in the past year my work as an independent consultant. I would say the majority of the photos were from old presentations and -- yes, old presentations that I did, which would have been public record.
Q. And you were part of Agriculture and Forestry?
A. MR. METHERAL: Yes. I was an engineer for Alberta Agriculture and Forestry. 13:31
Q. So you weren't -- you did not supervise the work that went on on November 14th, 2014, at the Muilwijk site; correct?
A. MR. METHERAL: That's correct.

Q. You spoke a little bit today about the importance of cold joints when laying RCC. To your knowledge, to your knowledge, were there cold joints when the RCC at the Muilwijk site was installed?

A. MR. METHERAL: I wouldn't have any information on that; I wasn't at site.

Q. Okay. Could we please --

A. MR. METHERAL: What I think -- I understand Arie could answer that question.

Q. Okay. Sure, Mr. Muilwijk, were there cold sites -- cold joints when the RCC at your site was installed? 13:32

A. MR. MUILWIJK: Negative. To my understanding, cold joints are only used when you have a day of work. Like so you pour on let's say a Monday, and then you don't quite get finished, then on a Tuesday you will start again. And that joint is considered as a cold joint. And at my property, we did everything in a single day.

So there was -- it was the process continually, so there was no cold joints at my property. 13:32

Q. Thank you very much. Can we move to Exhibit 96, please.

So Exhibit 96, I believe, is your written submission, Mr. Metheral. And if we could scroll down to page 2, near the bottom. There we go. And maybe

just like a line or two of the next page. Okay, that's perfect. Thank you.

So we've seen this before. I brought this up yesterday. There's a quotation here purportedly from Permit LA10054N. You'll agree with me that that quote is taken from the monitoring statement associated with that permit? I can bring it up if you like.

A. MR. METHERAL: Yeah, I believe the -- this was the -- an earlier permit that I pulled this statement from, yes, the one prior to -- 13:33

Q. This was Permit LA -- pardon me. This is LA10054N, that's what your submission suggests.

A. MR. METHERAL: Yes, I believe it is.

Q. Okay.

MS. VANCE: Document manager, since we're talking about it, could we please bring up Exhibit 104, which should be the monitoring statement associated with LA10054N.

Q. And if we just go down a little bit, there's a text underneath the bolded headings, the paragraph there. 13:34 Is that where you got this quote from?

A. MR. METHERAL: I believe so.

Q. Okay. If we could just scroll up a little bit.

You understand that this quote -- pardon me, so this monitoring statement relates to a condition in the

permit relating to the earthen manure storage, not to the catch basin? We can look at the permit --

A. MR. METHERAL: Can you repeat that question?

Q. You understand that this monitoring statement relates to a condition in that permit that relates to the earthen manure storage, not to the catch basin?

A. MR. METHERAL: Yes, that makes sense.

Q. Okay. We can pull up the permit if you would like.

A. MR. METHERAL: Okay, so let's pull up the permit.

Q. Okay. So the permit is in evidence at Exhibit 18. If we could scroll down to Condition 3, please. 13:35

So does that confirm that your understanding that the monitoring statement relates to Condition 3, which relates to the earthen manure storage? Sorry, you have to say something.

A. MR. METHERAL: Yes.

Q. Thank you.

A. MR. METHERAL: Yes.

MS. VANCE: Okay, thank you, I'm done with these documents. 13:36

Q. My last question, Mr. Metheral, when you were presenting your PowerPoint Number 1, you stated that one-third to one-half of feedlots in southern Alberta were putting in RCC. For clarity, they're not putting in RCC as a liner to meet AOPA groundwater protection

requirements; right?

A. MR. METHERAL: That's correct.

Q. Thank you. Those are my questions for you.

I would like to move to Mr. Lobbezoo, please.

Mr. Lobbezoo, when were you retained by the Muilwijks on this file?

THE CHAIR: Is the mic on?

A. MR. LOBBEZOO: It is on. I was thinking.

THE CHAIR: I'm sorry.

A. MR. LOBBEZOO: I was retained by the Muilwijks well before any RCC took place on this site. 13:37

Q. MS. VANCE: Okay.

A. MR. LOBBEZOO: I think it was in relation to the initial visit by Karl Ivarson, which happened maybe a year before this took place; I can't recall.

Q. Okay.

A. MR. LOBBEZOO: But it's several years ago.

Q. You mentioned, I believe, that when you were first involved with the RCC at the Muilwijks' site, you talked about some boreholes in 2019 in addition to the Chilako boreholes. Did you provide the results from your boreholes to Mr. Muilwijk? 13:38

A. MR. LOBBEZOO: No, I did not. Oh, did I? He and I -- I used the hand auger, a hand sampler, and he and I went around, and we sampled by hand a couple

locations. And we just talked about what we were seeing.

I have no records of that. That was just a site visit and a discussion, and it was akin to taking a shovel and digging a couple of holes just to talk about what was there.

Q. Okay. So it was that kind of borehole.

You also talked about communicating with Prairie Stone and Sub-Terrain Excavating before the installation of the RCC. Did you ever see any reports or documents from them afterwards? 13:39

A. MR. LOBBEZOO: No. The only report that I've seen from Prairie Stone is the recent compressive strength report for the product installed at the Muilwijks'.

Q. The one that Mr. Muilwijk received yesterday?

A. MR. LOBBEZOO: Yes.

Q. Thank you.

You spoke a little bit about your experience with mix designs. Did you design the mix for the Muilwijk site? 13:39

A. MR. LOBBEZOO: I did not.

Q. So you can't confirm that the mix for the Muilwijk site was the same as for Goldridge?

A. MR. LOBBEZOO: I cannot. In fact I know it's

not, but...

Q. You will agree with me that there is no standard, quote/unquote, "recipe" for RCC to use as an AOPA liner in Alberta?

A. MR. LOBBEZOO: You would have to rephrase your question.

Q. Would you agree with me --

A. MR. LOBBEZOO: So there is no standard -- okay.

Q. Go ahead.

A. MR. LOBBEZOO: There is no standard recipe for concrete for any application. 13:40

Q. Okay. And that includes RCC.

You will agree that what you put into your RCC recipe will have an impact on the hydraulic conductivity of that RCC; correct?

A. MR. LOBBEZOO: Yes.

Q. And it will have an impact on density?

A. MR. LOBBEZOO: Yes.

Q. And on compressive strength?

A. MR. LOBBEZOO: Yes. 13:41

Q. And on durability?

A. MR. LOBBEZOO: Yes.

Q. Thank you. This question is a bit of an oddball question, but I thought I would ask it. What I would commonly call the TAG report, it's Exhibit 81, if the

document manager could just bring it up. Have you read this?

A. MR. LOBBEZOO: I have skimmed through it. I have not read it in detail.

Q. And for your April 8, 2021, report, which is Exhibit 98, to what extent could this report play into your discussion in the April 8th report?

A. MR. LOBBEZOO: None.

Q. There's been a lot of discussion over the last day or so about professional -- about opinions from professional engineers. You understand that under AOPA, the opinion that counts under Section 19 is that of the approval officer; is that right? Do you want me to bring up -- 13:42

A. MR. LOBBEZOO: I'm not familiar with the section number and the specific wording of that, but that is my understanding.

Q. Okay.

A. MR. LOBBEZOO: It is the decision of the approval officer. That is my understanding, yes. 13:43

Q. Okay. And it's actually the opinion of the approval officer.

Now I would like to talk -- thank you for this document. I think we'll bring up Document 3 next, please.

So I would like to talk about two of your reports. We sort of have four. There's one dated June 18th, 2020, at Exhibit 86; one dated October 29th, 2020, at Exhibit 47; we have a November 6th, 2020, report, which is in this document starting at page 40; and then we have the April 8, 2020, report at Exhibit 98.

Now, I only want to talk about the November 6, 2020, and April 8, 2021, reports because the November 6, 2020, one is the one the approval officer ended up relying on, and the April 8th, 2021, report is the one that the Board may have to grapple with. 13:44

So if we'll start with this one, one of the areas -- well, so maybe we could move to page 43, please.

So on page 43, there's -- I think it would be fair to say that there's a few assumptions being made in terms of permeability of the glade zone or interface, as well as permeability through RCC mat. Would you agree with that?

A. MR. LOBBEZOO: Correct. 13:45

Q. Okay. So let's talk about the average calculated permeability through 150-millimetre thick RCC mat. This is the last paragraph on that page, about four to five lines down. Right. And you've identified it as 9.0 times 10 to the minus 8 centimetres per second.

My question is -- well, my question is where did you get that from?

A. MR. LOBBEZOO: So I testified to this earlier, because I knew this would be a question.

So 9 times 10 to the minus 8 took into account permeability of the RCC mat of 1 times 10 to the minus 9 centimetres per second, as indicated. The crack area assumed a permeability of 2.2 times 10 to the minus 5 centimetres per second as I recall. I'm going by memory. 13:46

As I stated in my earlier testimony, I had numerous iterations of this calculation that I was working through, and I had been also in those iterations using permeability values characteristic of silt, as if those cracks would be silt-filled.

So as I testified earlier, the combination of these three values for that crack width was not correct.

Q. Okay. And I'm not taking any issue with that. Thank you for that testimony. What I want to explore 13:47 is where a couple of the assumptions came from.

A. MR. LOBBEZOO: Sure.

Q. So in the second line -- first sentence, second line of this paragraph at the bottom of page 43, I believe that you were using typical permeability through RCC at

around 1 times 10 to the minus 9 centimetres per second?

A. MR. LOBBEZOO: Correct.

Q. I am guessing that that is related to -- just a minute. Well, I won't guess. Tell me where you got that number from.

A. MR. LOBBEZOO: I did not reference that number right there, but that was based on literature review.

Q. Okay.

A. MR. LOBBEZOO: So there's a few places in here where -- okay, literature review, that's my answer. 13:48

Q. Okay. And the -- three lines down in that same paragraph, there's a parenthetical comment about the cracked area having an assumed permeability of 1 times 10 to the minus 4 centimetres per second.

A. MR. LOBBEZOO: Yes.

Q. So the same question: Where did that come from?

A. MR. LOBBEZOO: So that's described in the paragraph above.

Q. Okay. 13:48

A. MR. LOBBEZOO: And that is referenced below in Footnotes Number 2 and 3.

Q. Okay. This is the Miller report that you were speaking about earlier?

A. MR. LOBBEZOO: Yes.

Q. Let's talk about that report for a moment. This is relating to permeability of the cracks. So I haven't read this paper. Can you tell me what the general scope of that paper was? You covered it a bit this morning, but I would like to hear it again.

A. MR. LOBBEZOO: Yes. So to be clear on that, I haven't read that paper again since the time that I wrote this report. So this is however many months ago that is.

So the gist of that report -- or the purpose of that report was, as I testified earlier, was to explore whether or not the glade interface between the manure and the soil below for sites that do not meet the AOPA constraints, if you will, to see if that glade layer would improve the soils enough to meet those AOPA constraints. 13:49

Q. Okay, thank you.

A. MR. LOBBEZOO: That was the general purpose of the study.

Q. Thank you. In that study, the interface and glade zone was not with RCC on top, between the manure pack and the underlying soils; correct? 13:50

A. MR. LOBBEZOO: That is correct.

Q. This was directly -- it was a soil-based feedlot pen placed directly on those soils?

A. MR. LOBBEZOO: Correct.
Q. And you would agree with me that in a feedlot with RCC, you are not going to get soils on the underlying -- pardon me, hooves on the underlaying soils?
A. MR. LOBBEZOO: I hope not.
Q. Or else that's going to crack.
A. MR. LOBBEZOO: Please repeat your question or your comment.
Q. Okay. You'll agree that in a feedlot with RCC, you are not going to get the hooves impacting the underlying soils directly? 13:51
A. MR. LOBBEZOO: That's correct.
Q. In the November 6, 2020, report, which we have up right now, I don't see the same kind of detail and formula as I do in the April 8th, 2021, report.
A. MR. LOBBEZOO: Correct.
Q. This is, for lack of a better term, this is kind of a show-your-work thing. Is that --
A. MR. LOBBEZOO: Yeah.
Q. -- an obligation of yours to show your work in your report like this? 13:52
A. MR. LOBBEZOO: No.
Q. No? Have you shown your work --
A. MR. LOBBEZOO: No.
Q. -- like that in previous reports?

A. MR. LOBBEZOO: Yes. When requested.
Q. Okay. So you weren't requested to do it in this case?
A. MR. LOBBEZOO: That's correct.
Q. The same exhibit, I think two pages earlier. So page 41, please.

All right. Here's a list of things that you talked about. There's a number of points. For instance, point 2, 4, and 5, where you referenced photographs. Which photographs are these?

A. MR. LOBBEZOO: These photographs were -- these photographs were submitted by Arie to Andy. 13:53

Q. Did you see the photographs?
A. MR. LOBBEZOO: Oh, yes.
Q. Okay. So these are the same ones that appear elsewhere in the technical document, the 12 photographs that Mr. Muilwijk submitted?
A. MR. LOBBEZOO: Yes.
Q. Okay. But you did not include them in your report?
A. MR. LOBBEZOO: No. And I discussed that with Mr. Muilwijk, and he said I have already submitted those pictures. 13:53

So in the interest of time and for not duplicating, I knew that Mr. Cumming's already had them, so I did not include them.

Q. Let me just find it. Number 4 talks about photographs

depicting the RCC being compacted using a walk-behind plate compactor. I wonder if you could kindly direct me to which photograph that is.

MS. VANCE: And for the document manager, I think we're probably looking at pages 37 through 39, if that would assist. If you could just stop us when we get to the right photograph.

A. MR. LOBBEZOO: Okay, they're way too small for me to see from this end. Okay, stop, stop.

Q. If Mr. Muilwijk would be better to answer this question, I'm happy to take an answer from him. But I just asked you because you have it in your report. 13:55

A. MR. MUILWIJK: So, yes, I do have the pictures right here in front of me. Now, there's maybe no exact picture where it shows like a person working with a plate tamper. We are able to see like the big packers and especially on the covered shelter. There was just pipes on -- and you can see that in Picture --

Scroll down a little or up, I suppose. Okay, maybe go back down, please. 13:56

Okay, so you can kind of it see it there right in front of the skidsteer, you'll see like a white post. So around those, they're able to get around those with a big packer as well. I know I was -- because I was present, and I'm willing to testify to that as well,

they did go around this with a small packer as well. But we also poured a concrete pad on top of this RCC liner as that's where the water will sit on, and that's like a 4-inch concrete pad that we poured later on on top of the RCC mat.

And as well for the corrals, a lot of these pictures I took more out of the sake of just taking a picture of the work than actually using it as a proof document. So had I known this would have been so important, I would have had 100 pictures or more. 13:57

But, yes, I know for a fact plate tampers were used around all the fence posts, around all the fence-lines, around all the bunk aprons, plate tampers were used. And then like the big rollers were used for the general area of the pen.

Q. Okay, thank you. I'll go back to Mr. Lobbezoo.

MS. VANCE: If we could have -- I think it's page 41 back, please.

Q. So after listening to Mr. Muilwijk, I have to ask why you wrote Number 4 about the photographs, of the walk-behind plate compactor. 13:58

A. MR. LOBBEZOO: I'm certain that I saw a walk-behind plate tamper in one of those pictures. That's why I wrote that.

Q. Okay, thank you. And also at Number 5 here you speak

about further photographs depicting a layer of straw. I'm guessing, correct me if I'm wrong, that these would also be the same photos as on page 37 and 38, as provided by Mr. Muilwijk; is that right?

A. MR. LOBBEZOO: These are the pictures of straw in the pens, yes.

Q. Okay. Can you tell from these photos how soon the straw was placed after the RCC was laid?

A. MR. LOBBEZOO: No, but --

Q. Can you tell how long the straw was there? And, I'm sorry, if you needed to finish your last response, please do so. 13:59

A. MR. LOBBEZOO: I'm happy to just answer the question.

Q. Thank you. In your report --

Can we go back to page 43, please. Down, please. There we go.

So I believe that you said that the permeability for the cracked areas assumed at 1 times 10 to the minus 4 centimetres a second came from the 2008 Miller report; correct? I think that's what you said a few minutes ago. 14:00

A. MR. LOBBEZOO: Yes, I did.

Q. All right. Can we bring up Exhibit 98, please. So this is the April 8th, 2021, report.

And, just to be clear, I'm asking these questions in an attempt to understand this new evidence. Of course this was not before the approval officer at the time. You understand that?

A. MR. LOBBEZOO: Yes.

Q. Thank you. So in this one, I understand that near the end of this paper -- or maybe the focus of this paper is sort of an average in theory. I think Mr. Metheral called it a composite. Just so the Board is clear, this is not what was proposed in the Muilwijks' application; right? This is new? 14:01

A. MR. LOBBEZOO: This is not new. This is what was proposed in the Muilwijk application.

Q. You understood that he was proposing some kind of multilayered, average hybrid -- I can't remember what the term is. It's a multilayer liner I think is the way it's termed. That's what you feel that the Muilwijks applied for?

A. MR. LOBBEZOO: No. The Muilwijks applied for RCC as a liner, and this report supports RCC as a liner. 14:02 **And in the discussion near the end of it, I demonstrate how the natural soils could add a little bit to it. But as you'll see in there, the RCC more than sufficed for the -- for the liner on its own accord.**

Q. Okay.

A. MR. LOBBEZOO: So I'm not necessarily trying to propose a composite, but, for the benefit of the Board, I think it was helpful to show that if we add these few things together that there is a little bit more protection here that could possibly be considered.

Q. Okay, that clears it up for me.

A. MR. LOBBEZOO: So I wouldn't call it -- okay.

Q. Because I felt like it was a new kind of proposal, and so what you're telling me is that it's not a new proposal, it's maybe just additional information? 14:03

A. MR. LOBBEZOO: Correct.

Q. Okay. The average permeability of the RCC that you used in your -- I think I'm talking about November -- oh, no, I'm not. I'm talking about this one. In this report, those numbers are not actually from the site. Are they also from literature?

A. MR. LOBBEZOO: The permeability numbers indicated from -- for RCC is from the literature. And in this case I actually referenced the literature.

Q. Perfect. 14:03

A. MR. LOBBEZOO: Or one of the -- one of the literature.

Q. And is that -- maybe we could just move to that. Is that the Portland Cement paper from 2006?

A. MR. LOBBEZOO: Yes.

Q. Okay, let's go down to that. I think it's at page -- maybe the next page. Right. Okay, stop there, please.

So this is Footnote 3, Wayne Adaska, roller compacted concrete, published 2006. The article indicates a range of permeability of .15 to 15 times 10 to the minus 9 centimetres per second. That's what the footnote says.

So I'm thinking that you probably got your theoretical -- or I'll call it a book value for lack of a better term, literature value, from the fastest in the range. Is that fair to say? It might help to just read some of the text up above, where you discuss the range in relation to Footnote 3. There it is. 14:04

So this is the first --

A. MR. LOBBEZOO: Yes.

Q. -- paragraph under the heading of "Permeability through RCC," the last couple of lines. Okay.

A. MR. LOBBEZOO: Yes.

Q. Okay. So that 2006 paper, the data that they used, that that paper used to come up with this range, what was the date of that data? 14:05

A. MR. LOBBEZOO: The date of the data from the -- from the...

Q. I can ask it again, if it would help.

A. MR. LOBBEZOO: Can you rephrase the question?

Q. Sure.
A. MR. LOBBEZOO: Yeah.
Q. So you told us that this publication by the Portland Cement Association indicates a range for typical permeability values through RCC?
A. MR. LOBBEZOO: Yes.
Q. And they give a range. And your footnote also talks about it. So my question is --
A. MR. LOBBEZOO: Yes.
Q. -- in that paper -- 14:06
A. MR. LOBBEZOO: Yes.
Q. -- what is the date of the data that they used to come up with that range?
A. MR. LOBBEZOO: It was not provided. It made reference to one other paper, but I'm not -- I cannot recall the date of the paper that it made reference to. But it made reference to this paper as a -- they said something different, but -- so that -- the date was not provided in that paper.
Q. Could it be 1999? 14:06
A. MR. LOBBEZOO: Oh, sure, yes.
Q. Okay. You did read the paper, I presume?
A. MR. LOBBEZOO: Yes.
Q. Thank you.
THE CHAIR: Ms. Vance, maybe I could ask a

quick question.

MS. VANCE: Sure.

THE CHAIR: At the very beginning of yesterday you indicated that of course the approval officer takes no position on whether the Board upholds or overturns the approval officer decision, and most of your direct and cross would be related to the record of which the approval officer made his decision. This is -- now, most of this that you're asking about is de novo, and I don't believe your approval officer is in a position to make a decision now. 14:07

MS. VANCE: No.

THE CHAIR: So you've shown a lot of difference, but, in fairness, I think, you know, probably Mr. Kennedy is going to be asking the panel some questions. You're going into some detail. Some of it helpful, to be fair, but I think -- to some degree I think we need to be careful about really, you know, the roles of you as a counsel on the approval officer's side and Mr. Kennedy. And perhaps a quick caucus between you two might be helpful or not, but did you -- how much more did you have? Particularly on the new elements of the submissions made by Mr. Muilwijk's team. 14:07

MS. VANCE: And I completely take your point.

I'm just trying to figure out where Mr. Lobbezoo got his -- we can go back to the November 6 paper. I believe there's even less information there. We can go back and talk about the permeability in that paper. That would be more on point.

THE CHAIR: Yeah. And like I say, you know, I think we've shown a fair amount of difference. We don't have to cut the razor thin line on where that is, but it just seemed like maybe we're starting to get a bit further over than we needed to be into Mr. Kennedy's role versus yours, but -- 14:08

MS. VANCE: Okay. Can I ask one question follow-up on this point --

THE CHAIR: Yes, please do.

MS. VANCE: -- that will hopefully address your concerns.

Q. This 2006 paper, is this the same source that you used to come up with the RCC permeability for your assumption in the November 6 report?

A. MR. LOBBEZOO: It was one of the references, but I thought it was clear in the publication by the Portland Cement Association, and I thought the Portland Cement Association, given that they are the Portland Cement Association, carried more gravity than maybe some of the others that I was referencing. 14:08

Q. Okay. I'm just trying to find out where your assumptions have come from. So I think I've taken that as far as I can.

Do you know what the water/cement ratio is for the RCC at the Muilwijk site?

A. MR. LOBBEZOO: I have been told what it was designed to be.

Q. Okay. Do you know what the aggregate mix is at that site?

A. MR. LOBBEZOO: Yes, I do. 14:09

Q. What is the aggregate mix?

A. MR. LOBBEZOO: The aggregate was sourced from the White Lake gravel pit, which is proximate to the site, and we provide quality control services to that gravel pit. So I do have -- in our documents we do have data on the materials used at the Muilwijk site.

Q. Okay. But you didn't include that here?

A. MR. LOBBEZOO: No, I did not.

Q. I think I'm just about done. I have maybe just a couple more. Just bear with me. 14:10

So cracking. I think that you earlier talked about cracking in large and very large slabs. In your view, are the RCC slabs at the Muilwijk site large or very large?

A. MR. LOBBEZOO: Yes.

Q. And is there -- I think you suggested, please correct me if I'm wrong, that there will be the same cracking on a large slab whether there's rebar there or not. Do I have that right?

A. MR. LOBBEZOO: As I testified earlier, the sum total of the crack widths would generally be the same, whether there's rebar or not. What I've testified, as has Mr. Both, is that the -- with the more tensile strength you've put into the slab through rebar, the crack spacing increases, as does the crack width. And Mr. Both demonstrated that. 14:11

Q. In your November 6th, 2020, report, which is Exhibit 3 --

A. MR. LOBBEZOO: Yes.

Q. -- one of your assumptions was a 20-millimetre wide crack going in both directions?

A. MR. LOBBEZOO: Yes.

Q. And then -- so where did you get that assumption from? I think it's just up a little bit. Thank you.

A. MR. LOBBEZOO: That was not an assumption of cracks. That was a hypothetical -- that was just a hypothetical what-if scenario. 14:12

Q. Okay. And not to wade too far into the new stuff, but I believe that that hypothetical changed to 15 millimetres in your April 8, 2020 (sic) report. Can

you just confirm that?

A. MR. LOBBEZOO: Yes.

Q. Thank you. I think those are my questions for Mr. Lobbezoo. Thank you so much for being patient.

A. MR. LOBBEZOO: Thanks.

Q. And I just have a few for Mr. Both.

Mr. Both, I enjoyed hearing from you. You're obviously passionate about concrete, which I really appreciate.

So what I heard you say is that you designed the RCC mix for the Muilwijks; is that right? 14:13

A. MR. BOTH: That is correct.

Q. Okay. And did you provide -- did you prepare the RCC mix with an eye to AOPA liner specifications?

A. MR. BOTH: I did it with an eye to what was prescribed for the Stronks' application, performance-based criteria.

Q. You talked about early life cracking and later life cracking, and I think maybe I understood near the end of your testimony what that means. And I was going to ask what's an early life and later life. Is it fair to just kind of use your tables there to understand that? Okay. 14:14

A. MR. BOTH: Yes, ma'am.

Q. There's no, like, black and white time or changes from

early to later life?

A. MR. BOTH: It's a gradual process, correct.

Q. Okay, thank you.

Maybe we could bring up Exhibit 97, please, which is Mr. Both's document. Yes, that page actually, thank you, page 4.

At the bottom under "Factors Used in Calculations," for concrete strength and age of concrete it says "see graph." Is that a reference to the tables above or is that something else? 14:15

A. MR. BOTH: No, that's an error. I apologize. That's a reference to the tables above, as opposed to the graphs above.

Q. Okay. I wondered about that, but I wanted to make sure you had a chance to clear that up.

A. MR. BOTH: I appreciate that. Thank you.

Q. You spoke about concrete being very provable and some imperical testing methods. To your knowledge, did Sub-Terrain Excavating provide testing results for base preparation? 14:15

A. MR. BOTH: Not to my knowledge.

Q. Okay. I think those are all the questions I had for you. Thank you.

Thank you all four of you.

A. MR. BOTH: Thank you.

THE CHAIR: Thank you, Ms. Vance.

We'll move to Mr. Kennedy, and then on to Panel members.

MR. KENNEDY QUESTIONS THE PANEL:

Q. So this is going to jump around a fair bit because Ms. Vance covered a number of my questions.

THE CHAIR: I was going to ask if you had any left actually, Mr. Kennedy.

MR. KENNEDY: Well, some. And some of them have been partially answered, but perhaps a little more clarity might help. 14:16

Q. I think this one is for Mr. Lobbezoo. You know, much reference has been made to the Stronks application and the permit. And, of course, the key permit condition associated with that Stronks application required a stamped and signed report from a professional engineer that was engaged with the design, installation, and initial inspection of that facility. And I want to get an idea. So my questions are going to relate to, you know, what we had and perhaps what we don't have as consequences to things -- how things unfolded in this case. 14:17

So with that -- do you understand the background, Mr. Lobbezoo? Just in terms of -- you know, the introduction I gave, so the context in which I'm

looking for you to respond?
A. MR. LOBBEZOO: I think so.
Q. Okay. And the first premise is, how helpful is it to have that professional engineer report during the design, construction, and immediate post-construction inspection?
A. MR. LOBBEZOO: Are we referring to the Stronks again or --
Q. Well, in general. So, I mean, this is a condition. Much has been made about the similarities to the Stronks' facility. 14:18
A. MR. LOBBEZOO: Yeah, yeah, yes.
Q. So the role of an engineer, what can you contribute if this is done?
A. MR. LOBBEZOO: Yeah. So what can I contribute and what did I contribute? Maybe those two to compare?
Q. Yeah. So what --
A. MR. LOBBEZOO: So what we can --
Q. What's missing? You know, what do we have and what's missing? 14:18
A. MR. LOBBEZOO: Okay, good, yes.
In the Stronks' permit, one of the conditions was to provide an engineered stamped letter -- and I'm going by memory here -- and it identified a series of bullets that they wanted covered. They wanted me to --

the engineer stamping to specifically speak to half a dozen points or so. So in that case I spoke to those very specific points. It did not include an engineer's review of the mix design, per se.

So to answer to your question, one of the things we could contribute is an engineer review of the mix design itself to start with, yes.

Q. Okay. So I'm going to stop you there, because I'll take you through the individual bullets.

A. MR. LOBBEZOO: Okay. 14:19

MR. METHERAL: Could we put the bullets --

Q. MR. KENNEDY: I'm sorry?

MR. METHERAL: Sorry to interrupt. Can we put it on our screen for review?

Q. MR. KENNEDY: Oh, sure. It is Exhibit -- I think it's part of Exhibit 94. I'm just not sure of the -- I'm not sure of the page number because I pulled it out of -- I think I've printed this one off several times and it was the looseleaf part of the document.

Yeah, it's the approval document itself rather than the decision summary. 14:20

A. MR. LOBBEZOO: That's the spring Point 1 too, by the way.

Q. It might be the very first. Let's start at the very -- no. Oh, this is it. This is it. And I'm looking at

page 3 perhaps of this -- of the approval. There we go. Sorry, I have to get pretty close to the screen to read my text if I do it there.

Now, in your last statement, I think you referred to the formula or the recipe for the RCC as being something you would look at as the engineer. Do I have it right that you have never seen the recipe for this application?

A. MR. LOBBEZOO: I have not seen the specific recipe for the application. I mean, they're generally similar between concrete to concrete, and I was told what the water/cement ratio was and what the moisture content would be, but I have not seen a written-out recipe, no. So your answer is yes. 14:21

Q. But I think I understood that you said that would be an important thing for you to look at if you were doing the Stronks' review with your certification.

A. MR. LOBBEZOO: I think for RCC as a liner, yes. The answer is yes. I mean, it would provide a -- there would be benefits to the NRCB for that, yes. 14:22

Q. And would the recipe make a difference in terms of the permeability of that RCC?

A. MR. LOBBEZOO: The RCC that's being designed around here would all have similar permeability characteristics. So variations in the recipe would not

necessarily substantially change the permeability character.

Q. So maybe I can go back. Rather than to guess as to why you think it would be important to see the recipe, why don't you tell me.

A. MR. LOBBEZOO: For a more complete package -- okay. If we -- if we look at the use of HDPE liners, for instance, the NRCB usually is interested in shop tickets or some sort of verification that the thickness was what it needed to be and the properties were whatever they needed to be. So maybe that same logic could be applied to RCC. I'm suggesting that. And the provision of a mix design would maybe parallel that a little bit better. 14:23

Q. But at least in the Metheral (sic) case, you were able to reach a number of conclusions in your report and affix your stamp without understanding the recipe for the RCC?

A. MR. LOBBEZOO: Yes, because I was on site looking at it, doing the Schmidt hammer testing, taking the cores and observing the concrete itself, and it appeared to be an appropriately, properly apportioned dense mix suitable for that. So I was able to get the information from the core itself without review of the recipe. 14:24

Q. And maybe this question is for Mr. Both. Is there a problem in just providing the recipe that was used?

A. MR. BOTH: I mean, the easy answer to the question is no, it's not a problem. The industry, however, is a performance -- concrete manufacturing industry is a performance-based industry. So mix designs are proprietary for the producer. We each have our own little way of coming to the same end result, including the materials we use and the proportions that we use. 14:25

When we're giving a performance criteria, and the performance criteria is to a certain MPa, then we build the mix design for that certain MPa to ensure that we get there.

Is it a difficult thing to provide it? The answer is no. Is it constantly being hidden? Yes.

Q. Sorry, I'm just going to ask you to slow down in our answers --

A. MR. BOTH: Of course.

Q. -- as we really do want to maintain the transcript. 14:25

But when you refer to this as proprietary, you have no problem providing it to an independent engineer who might be providing oversight at the construction?

A. MR. BOTH: I don't have a problem. Our organization does not struggle providing it to an

engineer who is oversight over the facility.

Creating that into a public document does change things a little bit for me. So providing it so it becomes a public document, thereby giving to all of my competitors my proprietary mix design does create a little bit of an issue for me.

Q. And, again, I would ask you to respond just a little more slowly.

A. MR. BOTH: Sorry.

Q. And is that why we haven't seen the recipe in this instance? 14:26

A. MR. LOBBEZOO: In this instance we were never asked for the recipe.

Q. If I were to ask now, can it be provided?

A. MR. BOTH: Yes.

A. MR. LOBBEZOO: Yes.

Q. Thank you.

UNDERTAKING - TO PROVIDE THE RECIPE FOR THE MIX DESIGN FOR THE RCC

Q. MR. KENNEDY: And I don't know whether that will be helpful for the Panel or not, but perhaps if I can have your undertaking to provide that recipe -- 14:26

THE CHAIR: Mr. Kennedy, so just as I'm listening here, so that would be provided in confidence, though, so it won't show up in our public

documents, or how --

MR. KENNEDY: To be clear, if you undertake to provide it, it's going to go on a public record. So if you are reluctant to do that...

THE CHAIR: I just wanted to clarify.

A. MR. LOBBEZOO: And this is a very good point, and this is why we have good discussions like this. The mix recipe is owned by Prairie Stone at this point. It was provided by John Both to Prairie Stone. So I have no authority, neither does Arie Muilwijk or John Both, to provide that recipe. We would need their consent for that, and also their consent for it to be public.

Q. MR. KENNEDY: Okay.

A. MR. LOBBEZOO: And I can see -- the point was very good. This is proprietary, and it would not be unreasonable for Mr. Bremer of Prairie Stone to be very reluctant to make that public.

Q. All right. I'll leave it to the Panel. There is the potential to -- we have various methods of doing -- bringing in evidence on a confidential basis, and it's confidential to the parties to the proceeding, but I'll leave that to the Panel and I'm going to move on.

In effect it raises this question; and, Mr. Lobbezoo, I'm going to ask you to respond to it. If the recipe is proprietary and it's simply a formula

14:27

14:28

provided by the contractor who installs the RCC on site, if it is not provided to an engineer doing the oversight, as required in Stronks, what's the risk associated with that? As a professional engineer, is there a risk?

A. **MR. LOBBEZOO: It's probably a complicated answer to that. So I would say if there was performance-based criteria that a refutable concrete supplier was providing concrete to, and he was doing it to that performance-based criteria, the risk would be low. But in the case of Stronks, you don't see performance-based criteria there at all. So they could provide -- they could have provided anything.** 14:29

Q. And I don't want to dwell on this, Mr. Lobbezoo, but I do have the -- you were the one that raised the fact that the professional engineer in Stronks would need to see the recipe before affixing his stamp. And perhaps I'll leave it at that because I do want to move through these bullets, and I don't know that we're going to get much traction there. 14:30

So in terms of the bullets, and I'm now at the first bullet... Now, were the engineer that applied the stamp on Stronks?

A. **MR. LOBBEZOO: I was, yes.**

Q. Okay. So perhaps, and again we're not reviewing

Stronks, but what could you do on Stronks with respect to the first bullet that you could not do on this site, on the Metheral (sic) site? So is there anything missing as a consequence of the fact that you weren't involved during the design, application, and construction?

A. MR. LOBBEZOO: No. The locations are specified --

Q. Okay.

A. MR. LOBBEZOO: -- on the site plan, yeah. 14:31

Q. Okay. And how about the bed for the liner was level and compacted before the RCC is installed?

A. MR. LOBBEZOO: The evidence that I had for -- so I could speak to both sides.

In the case of Stronks, we did -- because there was a lot more subgrade preparation at Stronks, we were on site doing compaction testing and the like. Whereas at Mr. Muilwijk's site, there was really limited, you know, subgrade preparation activity required. So this was a much easier task at the Muilwijks, and there's 14:32 **enough evidence and documentation that I could -- I could satisfy that.**

Q. And was there a report prepared by the person who prepared the subgrade?

A. MR. LOBBEZOO: There was not.

Q. Okay. So when you talk about evidence, what evidence are you relying on? And do we have it on the record today?

A. MR. LOBBEZOO: We have the photographs. The other evidence that I have specific to Mr. Muilwijk's site is the contractor, Sub-Terrain, is an acquaintance of mine. I discussed with him the procedure for doing this. I know him well. And when I talked about him -- to him later about this, you know, he affirmed the activities that were carried on there. 14:33

Q. In the third bullet you talk about an even thickness of 7 inches when applied and 6 inches when compacted. Is there -- and you've got core samples which you're relying on in the case of Muilwijk. Would that be the entirety of what you would have been relying on in the Stronks application?

A. MR. LOBBEZOO: Well, in this case there's really -- the product being placed on the bed with an even thickness of at least 7 inches -- I mean, it actually doesn't matter what the initial placement 14:33 **thickness would be if the end product that's compacted is more than -- sorry, the even thickness of 7 inches. When it's compacted to 6 inches, that's what governs there.**

So in the case of Mr. Muilwijk, no, I wasn't on

site to see that it was 7 inches thick placed loosely, but we know that it's more than 6 inches. And in actually many cases it's more than 7 inches as well.

Q. Do you know that from a report from the installer or simply from the core tests?

A. MR. LOBBEZOO: I know that from the core tests.

Q. And in terms of, I'm moving on to the fourth bullet, properly compacted around transition zones. What are you relying in this instance on and what would you have relied on in issuing your report on Stronks? Are there differences? 14:34

A. MR. LOBBEZOO: Well, when you look at the -- okay. At Stronks, we were on site during the compaction of the RCC. So, yes, I have -- I had a technician that was on site to observe what was going on with the compaction around the stock waters.

At the Muilwijks', no, I only have evidence at posts and at waterers that the material is well compacted. I can take my Schmidt hammer and apply a test right there. I could do a core right there if I needed to. 14:35

Q. And did you get a -- did you get a report or speak directly to the people that performed those functions?

A. MR. LOBBEZOO: I spoke directly to the owner of Sub-Terrain Excavating, and in our discussions I

reminded him again about the importance of compacting around these appurtenances.

Q. But, to be clear, you didn't have that conversation before it happened at the Muilwijk site?

A. MR. LOBBEZOO: I talked to the -- yes, I did. Before? The day or so before I talked specifically with the contractor about this project, and I went over that with him.

Q. Okay. And with respect to the straw coverage -- and I think Ms. Vance asked some questions about that, but what I wasn't clear on is how does that relate to an engineer's report? You know, what do you need so that you can put a stamp on a report and say this piece was satisfied? 14:36

A. MR. LOBBEZOO: So if the RCC was not properly cured, if you will -- and, I mean, there's various situations where the straw and the water become much more important than others. In hot weather the straw and the water is much more important than in, say, cooler, wet weather. So in the case of -- well, in any RCC case, one would be able to look at the surface if it did not properly cure, and you should be able to see spalling or spider cracking on the surface or those sorts of characteristics in the surface of the RCC, which may indicate that it -- that the surface didn't 14:37

cure properly because it wasn't hydrated the way it should be.

So in the case of --

Q. No, no, I think that -- sorry, I didn't mean to interrupt. No, I --

A. MR. LOBBEZOO: I -- I'm sorry. It's the difficulty with this Zoom call. I would like to just finish, if I may, Mr. Kennedy.

Q. Please.

A. MR. LOBBEZOO: So in the case of the Stronks' site, myself, after the concrete had been placed, I was on site with a technician to physically go through the slab and to assess the thickness of the slab. So I was able to assess it there. 14:38

In the case of Mr. Muilwijk's site, yeah, when I got to the site the first time, there was already manure on it. But, nevertheless, we did clear off areas of manure to do the Schmidt hammer testing. In the case of Mr. Muilwijk's test, because there was decent performance with the Schmidt hammer from the surface, that would indicate to me that the surface had cured properly, and I had no concerns at all that there was any improper curing. 14:38

Q. Okay. I think those may be my questions.

No, I have a couple more, and I'm not sure whether

these are for you, Mr. Lobbezoo, or they might be for Mr. Metheral, they might be for Mr. Both, and it's about crack response. And I'm trying to remember who gave the answer, but I thought I heard that once cracks appear in RCC concrete -- or the liner, is that there is no response to crack control.

THE CHAIR: Who is going to answer? Just say your name for the court reporter, please.

A. MR. BOTH: Is that John?

THE CHAIR: I can hardly hear you. Who is speaking? 14:40

A. MR. BOTH: John, would you like me to answer that, John Lobbezoo?

A. MR. LOBBEZOO: Yes, please.

A. MR. BOTH: John Both here. I can speak to that.

Once -- cracks typically form in all concrete in the first 24 hours. They're not visible typically, but they form within the first 24 hours. Crack control after 24 hours usually has very little impact on determining where the concrete is going to crack. 14:40

Q. MR. KENNEDY: May I just stop you. I'm talking about remedial response to cracks that you know are there. And I think I heard that they are what they are and rely on perhaps a glade layer response, and that

would be the best response possible.

A. MR. BOTH: Mr. Lobbezoo should answer that question.

A. MR. LOBBEZOO: Okay. Well, you're -- so control of the crack, the glade layer filling it in. Yeah, was there actually a question in there?

Q. Yeah. So I just wanted to confirm my understanding, is there is no technical ability to provide an engineered response to cracks once they appear in RCC. Is that correct? 14:41

A. MR. LOBBEZOO: Yes, but I would like to expand on that. In the case that the cracks deteriorate and widen and are a problem, those crack sections can be cut out and replaced. So that would be a potential response, engineered response.

Q. And you've relied on this glade protection --

A. MR. LOBBEZOO: Yes.

Q. -- in terms of providing some permeability protection. Can you direct the Board to any studies that would support that assertion? And I'm talking about in these 15-millimetre cracks. 14:42

A. MR. LOBBEZOO: I cannot.

Q. Okay.

A. MR. LOBBEZOO: I have not found any studies that people are doing conductivity testing through cracks.

So I spent some time considering, well, what would the crack fill up with and what would be the most appropriate response. And the use of the glade material in it and the permeability value that I used I think are quite a conservative approach to it. You have to understand that the number that I used, 1 times 10 to the minus 4, that's -- that's a permeability characteristic similar to fine sand. It's not like it's -- it would not take much to achieve that permeability characteristic. 14:43

Q. Okay. So I think some of these questions may be for Mr. Muilwijk. Is he available? I just don't see him on the screen.

A. MR. MUILWIJK: Yes, I am available.

Q. Thank you. So, Mr. Muilwijk, a simple question, and not that there's a curative response, but perhaps the explanation might be helpful. You had this construction set up for a specific date. You know, it in effect gave you no break or, you know, even a day's delay would have meant you would start construction 14:44 early. How far in advance of November 14th did you book the construction?

A. MR. MUILWIJK: Well, we had been talking about this construction for a while. I had no idea exactly when this permit was going to be coming. So when I had

handed in my Part 2 application to Ms. Snowdon, we've kind of been talking back and forth with Sub-Terrain and Prairie Stone, like, you know, when are we able to roughly get this figured in.

So then on a verbal phone call with Ms. Snowdon, when I was given the date of November 14, basically that's the -- I just went off of that date. Even just weather-wise, going later into the year, I could have done November 15 too or November 16. I just wanted to get it done as soon as possible and it just concerned weather and whatnot. 14:45

And the time period from when I booked it? Oh, boy. I think it would have been two or three weeks, roughly in there.

Q. That's sufficient. Thank you. And I gather at the time you were planning RCC as a liner, you became very familiar with the Stronks approval? Is that -- and the conditions associated with it and those pieces? Is that fair?

A. MR. MUILWIJK: Yes, fairly. So, yeah, because Ms. Snowdon was using the Stronks' file as a guidance for her as well, because she was quite new to everything as well. So she was using the Stronks' file to be a guidance to her in my Part 2 of my permit application. 14:46

Q. And it's fair that you might have assumed that you might see very similar conditions imposed on you than what was imposed on Stronks?

A. MR. MUILWIJK: Yes, correct.

Q. Okay. And there's a provision there. Do you remember reading the provision that says post-construction and before the pens are stocked that the NRCB approval officer would have -- would come out and inspect and approve the facility as built?

A. MR. MUILWIJK: Possibly I might have just -- with everything going on at the time, yeah, that I over -- overlooked it or whatever. It could have -- it probably was in my mind at the time that an NRCB officer will have to come look at it, but with so much going on and winter and whatnot, it probably got overlooked, overthought, and -- 14:47

Q. I'm wondering why, with all -- and you described in your testimony earlier today all of the communications that you had with Ms. Snowdon and the NRCB. In none of those conversations did you raise the fact that you had constructed the facility, nor did you invite -- you know, thinking that it might be important for an NRCB approval officer to come out and inspect those facilities before animals were put on site. Did that occur to you at any time? 14:47

A. MR. MUILWIJK: Well, yes -- yes, it did. And Ms. Snowdon had told me I shouldn't be building, and we had brought up as well that there was stuff -- you know, we were working on the catch basin at one point in time, and she herself didn't -- wasn't bothered to come look as well.

But I also maybe withheld it from her. I didn't want it to skew any of her -- the decisions on my permit. So I let it be. And I realized I should have informed her, but I never did and that's my bad there. 14:48

MR. KENNEDY: I'm just checking my notes. I may be done, Mr. Chair.

Q. I'm going to ask one question on fly control, because you've objected to that condition to an approval should you get one. And the question is this: As you are currently operating -- or you have been operating in the past to a point in time where that condition was part of your approval, what kind of fly control did you have in place? What program did you use?

A. MR. MUILWIJK: So how and what -- could you explain on my current -- or my fly control prior to this? 14:50

Q. Yes. So this is -- you know -- was the original permit was issued by the municipality, and it contained a requirement that you have a fly control program in

place. I'm simply asking what you did in the past to meet that condition.

A. MR. MUILWIJK: So that permit was for the hogs. With the hogs being on liquid, being on top of basically a liquid pit, there is basically zero flies in a hog barn. You will always get some flies in like a dry manure area, which with the hogs, and that goes back nine, ten years let's say, with the hogs, we would just throw poison on the floor, and that was -- that was it. 14:50

With the calves, however, in my barn I didn't have any flies because of the liquid -- the liquid slurry underneath, like inside the pits, there was no fly breeding going on.

The only main areas where I did have flies was on solid manure storage, especially in the hutches, the outside hutches, and there I would -- once a week I would just basically spray a fly poison, and that would control the flies.

Yeah, that basically took care of the fly control right there. 14:51

Q. Okay. Thank you.

MR. KENNEDY: Thank you, panel. Thank you, Board. Those are my questions.

THE CHAIR: Thank you, Mr. Kennedy.

Mr. Graham? I believe he could hear us, but we may be in that spot where we can't hear him. I see his mute is on, but I believe he's on another line.

Mr. Graham, are you there?

MR. GRAHAM: Does that work?

THE CHAIR: Yes. It does.

MR. GRAHAM QUESTIONS THE PANEL:

Q. Okay. Most of my queries have been answered, but I have one for John Both, and that's on the Schmidt hammer. Because I think we've heard conflicting ideas on a -- on the use of the Schmidt hammer. 14:52

So if you could just go through that again. We'd heard before that it couldn't be used on a rough surface. So explain that to me, how you use it versus what we were told before?

A. MR. BOTH: Sure. Appreciate that, Mr. Graham.

Using a Schmidt hammer on a less than perfectly smooth surface does require a little bit of an eye. You need to be looking for an area that is somewhat flat and smooth, which you will get in RCC. The concern, though, is that because it is not perfectly smooth, it will impact the results, and my experience is it impacts those results downward, not upward. 14:52

Q. So in a positive way?
A. MR. BOTH: If we're looking to be conservative, that is correct.
Q. Okay.
A. MR. BOTH: We will find that the results are coming in lower than they actually would be if we were to core those samples.
Q. Okay, thank you.
MR. GRAHAM: That's it for me.
THE CHAIR: Thank you, Mr. Graham. 14:53
Ms. Stuart?
MS. STUART: Thank you, Mr. Chair.
THE CHAIR: Oh, I think Ms. Stuart is frozen.
MS. STUART: No, I think I'm here.
THE CHAIR: No. Thank you.
MS. STUART: Thank you, Mr. Chair.
MS. STUART QUESTIONS THE PANEL:
Q. I have a follow-up question on that Schmidt hammer for Mr. Lobbezoo.
Mr. Lobbezoo, correct me if I didn't get this straight. I thought when you mentioned the results of the Schmidt hammer, you said that it could be plus or minus 10 percent. Can you reconcile that with what we just heard from Mr. Both? 14:54
A. MR. LOBBEZOO: Mr. Both is the one that provided

the 10 percent range, and he is correct.

Schmidt hammer testing is considered a non-destructive testing. It gives you an idea of what the strengths would be. So if you're testing a certain spot, it's very easy to do five, six tests in a very small area and take an average of all those results. And they do vary up and down a little bit, but it's very quick and easy, yes.

Q. Okay, thanks very much.

Now, similar to Mr. Graham, you've answered a lot of my questions, so forgive me while I just kind of look through my list. I do apologize for what will be musical chairs in your office in the south. 14:54

But Mr. Muilwijk, I have a couple of quick questions for you, if I can.

A. MR. MUILWIJK: Okay.

Q. And do I have your pronunciation right, is it Muilwijk?

A. MR. MUILWIJK: Yeah, that's good. It's a struggle for most people.

Q. I'm doing my best too. 14:55

So I just wanted to confirm. Mr. Lobbezoo had mentioned, I believe, that you had called him -- I'm going to guess that was done November 14th when the RCC was placed by Prairie Stone and asked if he could come on site and that he declined to come on site. Is that

correct?

A. MR. MUILWIJK: So that was the Sub -- or that was Sub-Terrain Excavating who had called Mr. Lobbezoo to ask if he could come on site. That was not myself.

Q. Okay.

A. MR. MUILWIJK: I was in contact with him on several things, but I was not the one who asked him to be on site. That was Sub-Terrain.

Q. Okay, thank you. Thank you for that clarification.

In Exhibit -- I don't think we have to pull it up, unless you would like to, Mr. Muilwijk. But in Exhibit 44 it states that the corrals were -- RCC had been placed, had animals -- and I assume that's the outdoor corrals, had animals in it for several years and was compacted, and a few inches of the existing corral floor were removed to make it level. And, Mr. Muilwijk, in your testimony, you asserted that Mr. Cumming didn't ask you how the bed -- or the pen surface was prepared, so you didn't have an opportunity to describe that. 14:56

Is there anything you would like to describe now about how that surface was prepared?

A. MR. MUILWIJK: I'm willing to add onto it. So the reason that I had written -- or I had wroten down in there that the hoof action would have compacted it

was having animals in there for seven years, if there had been a low spot or a soft spot, that would have been dug out by those animals' hooves and by rain and whatnot earlier on.

There was no holes or anything in the pen prior to this. And with animals being in there all the time, like any hole would have been pounded out, if that's the proper word to use, would have been pounded out earlier.

So then to add onto the bed prep, so all they did was -- so my corral -- let's say was at this level here, we needed to add in 6, 7 inches of varsity seed (phonetic). 14:57

So all we did was scrape 6, 7 inches of material off of the corral, and we threw that over the fence, and then we laid the RCC on top of that bed.

Q. Okay.

A. MR. MUILWIJK: And then before we -- so once they scraped out 6 to 7 inches, we went over it with a packer, like a roller or whatever, just to make sure that there was no more low spots and everything was fine. 14:58

Q. Okay. Thank you, Mr. Muilwijk.

In that exercise, and we've had some discussion of that glade layer that, you know, I think there's pretty

general knowledge that that will establish in a feedlot floor pen after a period of time, were you able to observe that layer at the time of installation of the RCC?

A. MR. MUILWIJK: Well, we had scraped that -- we had taken that whole glade layer out. That would have been basically at the interface between the manure and the soil. We went down 6 -- we went down 7 inches of dirt, let's say.

So we took that glade layer out at this point of time. 14:58

Q. Okay. Thank you, for that clarification.

And a final question for you, Mr. Muilwijk. How long after the RCC placement was made did you add the straw layer as part of the curing process?

A. MR. MUILWIJK: The straw would have been added a day to two days later. The same -- like some of it was done the same day, other stuff was done the following day. Just we can only do so much in a day.

But yeah, it was done in a day or two after we placed it that that -- we had the straw on the RCC. 14:59

Q. So when you say some was done that day and some the next day, would there be like part of the pen was done or some of the pen -- you know, all of the pen was done with a thin layer or part was done and then part was

done later?

A. MR. MUILWIJK: So if my memory is correct, Pen 3 was done -- on my permit I guess, that's considered the new pen, was done the same night; everything else was done the following day. And then I think we added a little bit to the weaning shelter the day after that just because we had some extra straw sitting there, we added some more, yeah, two days later to the weaning shelter.

Q. Added some more to make the existing layer of straw thicker? 15:00

A. MR. MUILWIJK: Yes, correct.

Q. Okay, thank you. And those are all the questions I have for you, so thank you for your help.

Can I ask for musical chairs again? And I guess I should have mixed it around. If Mr. Lobbezoo can come back.

Just a clarification, Mr. Lobbezoo. I've got that pronunciation right?

A. MR. LOBBEZOO: Exactly right, yes. 15:00

Q. Oh, thanks heavens. I know we've had some discussion and probably some outstanding conversations that will happen on the rest of this side, and I appreciate the propriety nature of that. So if this is something that you can't answer, you know, please know that I

appreciate that. And don't if you can't.

You did -- I believe, and I don't recall who asked the question earlier, but I believe you stated earlier today that when we were talking about sulphate-resistant concrete, that -- I believe you said that suppliers in the area generally all use sulphate-resistant cement I guess would be the better word. Can you confirm that Prairie Stone did use sulphate-resistant cement?

A. MR. LOBBEZOO: I could confirm by asking him, but I know that that's all he uses, based on all my dealings with him. 15:01

Q. Okay, okay, thank you for that. And I think that's all the questions I have for you, Mr. Lobbezoo. Thank you.

And just I think two or three for Mr. Both. And I think I've got that right.

A. MR. BOTH: Yes, ma'am.

Q. Okay. Ms. Vance asked a question of you whether there is a standard recipe for any concrete application -- or, sorry, asked Mr. Lobbezoo, I think. And he responded that, you know, there isn't a standard recipe for any -- you know, any material on that -- any concrete material on that application. 15:02

Mr. Both, can I ask you, without disclosing the proprietary recipe discussion that we were -- that we

talked about, can you comment on the nature of recipe formulation, kind of what factors you consider in the recipe formulation of RCC? And Ms. Vance touched on it a bit with respect to, you know, with an eye of what was prescribed for the Stronks' application. But what -- what performance criteria you have in your mind as outcomes when you are either on your own or together with one of the other formulators establishing these formulations and what outcomes you're -- performance outcomes you're targeting? 15:03

A. MR. BOTH: Sure. When creating a mix design, you look at all of the performance criteria. So in those performance criteria, we're concerned with, in case, the compressive strength. We're concerned with the durability. We're concerned with the ultimate density. And you're concerned with the materials that you're going to be using.

The reason why there is not a standard mix design from the north side of the province to the south side of the province, even if all of the other criteria are 15:03 **the same is because aggregates will vary. The vast majority of concrete, and even more so on roller compacted concrete, is made up of aggregates, and aggregates will vary depending on its geographic location. And even within a certain pit they will vary**

somewhat.

So we take into consideration the performance of those aggregates. And when we look at those aggregates, we look at the gradation, as Mr. Lobbezoo has mentioned, we look at the gradation of those. We understand what we need for void fill, which is a requirement of the cement paste content, and we also consider the compactability of that material. Certain materials will require a higher moisture content or water content to compact in comparison to other 15:04
materials which may require a lower moisture content in order to ensure that we can get the compaction.

So our need to reach that 98 to 100 percent compaction is always a consideration, and that will help to drive the -- for instance, the water that is required.

So we started the most important aspects, and we work our way down. So sometimes if we're looking at -- looking at strength, that might be the greatest component. And so we build to strength. If we're 15:05
looking at its freeze/thaw durability, that may cause us to have to build a stronger concrete. Even though the strength might be required to be lower, we might design for a higher strength to ensure that we have better freeze/thaw durability, for example.

So mix design development, it's looking at all of the aspects and narrowing it down using the materials that we have at hand and then proportioning them accordingly.

Q. Okay. I appreciate that. Not being an engineer, it's extremely helpful to me.

Sort of given that, how do we look at that recipe formulation then to what you look at as an outcome in AOPA in hydraulic conductivity?

A. MR. BOTH: I'm sorry, could you just repeat that again for me? 15:06

Q. Sorry. So I'm wondering, given those parameters of compressive strength and density percentages and water content for those items that you mentioned, how can you then relate that for me to hydraulic conductivity, which is for us the outcome of AOPA that we need to meet?

A. MR. BOTH: Compressive strength and density will give us an indication of permeability.

Now, I'm not aware of any studies that will identically -- will ideally correlate those for us, but if we've got a known compressive strength -- and Mr. Lobbezoo would be probably better to answer that -- but if we've got a known compressive strength and we have a known density, that would give us a pretty good 15:06

indication of what the permeability is.

And what I'm stating there is that a lower density and a lower compressive strength would have a lower permeability versus a higher compressive strength, and a higher density would have a lower permeability. Sorry, I hope I stated that correctly.

Q. Okay. Thank you for that.

I think my last question would be, Mr. Both, given yesterday's testimony from field services, do you have an opinion on what testing would be required of the current RCC placement at Mr. Muilwijk's that would potentially satisfy what we need to satisfy in terms of the AOPA requirements? 15:07

A. MR. BOTH: I think when -- regarding all of the testimony that I have heard, the greatest factor involved, and we heard that through Mr. Cunningham yesterday had made that statement through his calculations, is that cracks will contribute the greatest amount of hydraulic conductivity.

And so with respect to the Muilwijk facility, it would be inspecting for cracks to see what degree of cracking we have taking place. And in my opinion, if that's a random check, that should be sufficient. 15:08

Q. And then the -- just to follow onto that, then the remedy for that cracking?

A. MR. BOTH: It may require calculations to ensure that we're within the calculations that had been done by Mr. Lobbezoo. And if the cracking is less than what he has done through his calculations, then no remedy is required in my mind.

Q. And if it was more, then the remedy would be what potentially, in terms of a structural correcting of that situation?

A. MR. BOTH: Fair. So if we've got a crack that is greater -- and if we just pick a random number of this 15 millimetres that's been thrown out, if we're over that 15 millimetres, for instance, a remedy would be to saw cut on either side of that crack and fill that area in with either wet concrete or roller compacted concrete, depending on what the dimension of that is. 15:09

If it's quite a narrow cut, then we would need to fill it in with a traditional (audio glitch) concrete. And if it's larger, then we could fill it in with roller compacted concrete. 15:09

Q. Okay. Mr. Both, thank you very much for your answers.

MS. STUART: Mr. Chair, that concludes my questions.

THE CHAIR: Thank you, Ms. Stuart.

Ms. Maharaj?

MS. MAHARAJ: Sorry. The phrase of the century, "I'm on mute."

MS. MAHARAJ QUESTIONS THE PANEL:

Q. I just have a few questions of clarification of Mr. Lobbezoo with respect to your report of November 6, 2020, at Exhibit 3, starting on page 40. In this report, you made some general statements with respect to the results of tasks, and my questions are really focused around the quantification of that testing.

So, for example, in paragraph 3, Number 3 on page 41 of Exhibit 3, this is the same list of eight items that we had gone to quite a lot. I'll let you find that. 15:10

MS. MAHARAJ: Or perhaps, document manager, if you could pop it up. Correct.

Q. So in Number 3 you say: (as read)

"Based on coring of several locations in the RCC, the thickness of RCC ranged between 155 millimetres and 205 millimetres, with an average thickness of 173 millimetres for eight cores..." 15:11

And it refers to a figure attached which is at page 45. If we can just slip over there. Perfect.

So those little squares in black in each of those areas, could you confirm for me that that is the

location of each of the cores? Because I only count seven. You're on mute, sir.

A. MR. LOBBEZOO: When I submitted this figure, I had marked the core locations with Xs, and it looks like on this document that somebody has highlighted it with boxes and that they missed one of the Xs right at the south end of the calf shelter building, right there.

So there's four in the calf shelter, and there was four in the RCC pen, the open pen area. 15:12

Q. Okay. Why did you choose four cores for the calf shelter building, which is a smaller area than any of the other pens?

A. MR. LOBBEZOO: No particular reason. It was -- when we did the calf shelter building, we had pushed the animals back. We had free rein for that area, so it was easier.

When we cored in the pens, we were sort of shooing the animals away as we cored. So we weren't interested in spending too much extra time in there. So we could 15:13 **have, though, but it was just more convenient to do it in the calf shelter, and that's where we had started. So that's why.**

Q. Okay. What kind of equipment did you use to do these cores? You had referred previously to hand augering,

and I'm curious as to whether you can hand auger through concrete or whether you had used something else?

A. MR. LOBBEZOO: It's an electric-powered core rig, and it uses a core barrel that's maybe that long, and the diameter was 75 millimetres, if I recall. I can't -- it's on the report. It's either 75 or 100, approximately.

Q. Okay.

A. MR. LOBBEZOO: And basically it's a diamond-tipped core bit that has water to circulate through it to keep the core. And you just carefully core down and recover the entire sample. 15:13

Q. Okay. How long does it take to do a core?

A. MR. LOBBEZOO: A matter of, say, several minutes.

Q. So five minutes-ish?

A. MR. LOBBEZOO: Yeah, maybe ten minutes, yeah.

Q. So you weren't in the populated pens for an hour to do a single core, for example?

A. MR. LOBBEZOO: No. 15:14

Q. No. Okay. And you mentioned that the diameter of the core is 75 or 100 millimetres. How big are each of the uncovered pens that we're seeing in this diagram?

A. MR. LOBBEZOO: They're approximately, as I recall, 30 metres wide by 36 metres deep. So in feet

that's 100 feet by 120, I believe, approximately. You were mute to that --

Q. Yeah, my screen went blank for just a second.

So you mentioned approximately 30 metres by 36 metres for each of the RCC pens?

A. MR. LOBBEZOO: Yes.

Q. Okay. And you took one core from each of the older pens and two cores from what Mr. Muilwijk has referred to as "the new pen"?

A. MR. LOBBEZOO: Yes. 15:15

Q. And that's what we're seeing here. Okay. Why didn't you take any more cores in such a large area, especially in those two uncovered pens?

A. MR. LOBBEZOO: I could have, but really there was no specification, if you will, saying you need to core this many per area. I suppose that in my work, we core along roadways quite often, and the core frequency is quite a bit more spaced out than what we would see here.

So I wouldn't necessarily say that -- I do take your point that, you know, one may consider that this isn't very many cores. But, at the same time, this -- in my opinion, this provided reasonable coverage. 15:16

The other aspect with it is that this is destructive testing. So every time you core, you do

open up a hole that has to be repaired. So there is that consideration as well against, say, overcoring.

Q. Okay. You indicated that you obviously were not there when this particular roller compacted concrete was placed. But do you have any information that might help us with respect to the consistency in general terms of this particular product? Does it tend to be very uniform or does it tend to be more variable?

A. MR. LOBBEZOO: The product itself coming out of the plant is quite consistent. Where the -- where the inconsistencies occur is where you have perhaps hypothetically an inconsistent subgrade or there could be inconsistencies with trucks that are staged ready to place it and they all sit there with full loads while everybody goes for lunch. And those sorts of construction --

So -- but the product itself as it's produced, I would say it is quite consistent.

15:17

Q. Okay. So working off of that assumption of consistency, the variables that would potentially affect a uniformity of application or a placement are the types that you've just described?

15:18

A. MR. LOBBEZOO: Yes.

Q. Is that correct?

A. MR. LOBBEZOO: Yes.

Q. Okay. But you yourself in formulating your opinion and deciding how many cores to take were not present during the installation or the placement, so you don't have a particular personal knowledge of the installation, shall we say, consistency or the appropriateness of the installation. Is that fair?

A. MR. LOBBEZOO: Not firsthand knowledge, that's fair.

Q. Okay. So you're relying on your expertise to say that the number of core samples that were taken should be sufficient given the type of material and what you know of this industry. Is that fair? 15:19

A. MR. LOBBEZOO: Yes.

Q. Sorry, yes, okay. And are these eight cores the sample results that were received yesterday that you've undertaken to provide to the panel?

A. MR. LOBBEZOO: In terms of compressive strength?

Q. Yes.

A. MR. LOBBEZOO: No.

Q. No, okay. 15:19

A. MR. LOBBEZOO: No.

Q. That's where I'm confused. What are the results that you referred to that were received yesterday that we are getting --

A. MR. LOBBEZOO: Okay.

Q. Yeah, and can you clarify?
A. MR. LOBBEZOO: So Prairie Stone, as they were the concrete supplier that is, as they were producing the concrete, cast some cylinders during the day that they were producing. So he has plant cylinders, if you will.
Q. Okay.
A. MR. LOBBEZOO: Or cylinders from the batch plants. Those are the compressive strength test results that Mr. Muilwijk had referred to earlier that were received. 15:20
Q. Okay. So then in paragraph 6 of Exhibit 3 at page 41, it says: (as read)

> "Laboratory density testing was carried out on sore samples recovered from the RCC mat."

Is that the testing of the eight cores referred to in Number 3?
A. MR. LOBBEZOO: Yes.
Q. Yes? 15:20
A. MR. LOBBEZOO: I'm in Number 6 --
Q. 6. Is that referring to the samples taken out of Number 3?
A. MR. LOBBEZOO: Yes.
Q. Okay. And you've given us some general results. Do

you have the specific results for each of the eight cores? Is that in evidence somewhere and I just missed it?

A. MR. LOBBEZOO: Yes.

Q. Yes, it is?

A. MR. LOBBEZOO: Appended to this letter. It's the last page of this letter.

Q. Oh, I see. The ones that have letters on page 46 of 100?

A. MR. LOBBEZOO: There they are. 15:21

Q. There they are, okay. Now, these are signed off by an Adam Johnson?

A. MR. LOBBEZOO: Yes.

Q. CET, and he's with Wood as well; correct?

A. MR. LOBBEZOO: He is the lab manager in this office, yes.

Q. Okay. And you mentioned that you were the responsible engineer for that lab -- for a lab. Is that the lab that did this testing?

A. MR. LOBBEZOO: That's correct. 15:21

Q. And did Mr. Johnson work under your supervision or control in conducting these tests?

A. MR. LOBBEZOO: He -- Mr. Johnson is my employee. He works under my supervision, yes.

Q. Okay, thank you.

Okay, if we could just return to page 41 quickly. I just have a few more questions.

Similar to my previous line of question is with respect to paragraph 7, and this is a test that I understand from reading your report that you did, which is great.

A. MR. LOBBEZOO: Yeah.

Q. This is the Schmidt hammer test, and you say here that the results indicate compressive strengths ranging from 25 MPa to 40 MPa. How many tests did you do with the Schmidt hammer, and approximately where were those tests conducted? 15:22

A. MR. LOBBEZOO: I generally did those tests in the area of the coring, because we were spending time at those locations coring.

Q. Okay. Would you have done -- I've never worked a Schmidt hammer, in all honesty, so would you do ten tests in a spot or two or thirty? What are we looking at here to arrive at this range?

A. MR. LOBBEZOO: At each spot I would do I would say five. 15:23

Q. Okay.

A. MR. LOBBEZOO: Yeah.

Q. Okay. I'm sorry, I'm getting a small amount of --

A. MR. LOBBEZOO: So Mr. Metheral suggested that he

had a photo in one of the exhibits of a project that I was on with him that showed me in the background actually doing the Schmidt hammer testing in 2015, I think.

Q. Yeah. It's okay. I'm sure you know how to work this piece of equipment. What I was curious about is whether or not the Schmidt hammer testing was conducted around the extrusions for the water bowls or for the poles, or was it in the middle of the placement? And I think what you've said is it was more in the middle of the placement if you were doing it around the coring locations; is that correct? 15:24

A. MR. LOBBEZOO: That's correct. I mean, I did not document the locations of the Schmidt hammer testing separately, and I want to underscore that this was not a requirement of, say, the Stronks' permit condition. The compressive strength testing was not in there at all.

So I never did this necessarily to, say -- I did this for information only. There was no frequency or intent that I was going to do a thorough Schmidt hammer testing of the entire site. 15:24

If I was going to do that, I would have spent more time around edges and posts doing that, I certainly would have. But in this case, I had the Schmidt hammer

with me, and it was merely out of convenience that as my technician was coring, I could just do the Schmidt hammer testing in the immediate vicinity of that.

Q. Okay, I appreciate that clarification, but I'm sure you can appreciate that this paragraph doesn't reflect that it was more informal or casual. It does seem to be put forward as an indicator of compressive strength.

So should we rely on this as an indication of the compressive strength of the entire placement or not?

A. MR. LOBBEZOO: The short answer is yes. This provides a broad overview of what the compressive strength of this material was -- was. 15:25

Q. Would it be fair to say that it's more in the nature of a snapshot than an analysis or a comprehensive piece of data?

A. MR. LOBBEZOO: Yes.

Q. Okay.

A. MR. LOBBEZOO: And the reason why I would say that is if you were -- if you were ever looking for more comprehensive data, then I would have done the core -- the testing on physical cores, which is much more accurate; it's very conclusive. 15:26

Q. That's good to know. Thank you.

My final question for you is with respect to the cracks. So if we could turn to page 43 of Exhibit 3,

at the end of the first full paragraph, the sentence beginning "this is... " Up a little bit, I think. Yeah, if you could just keep scrolling up a smidge. Perfect, thank you.

So at the end of the first full paragraph, it says: (as read)

"This is generally consistent with Wood's observations of older RCC mats..."

And that's referring to the information previous: (as read)

"...though it is noted that after one year, no readily observable cracking was noted in the RCC mats at the subject Muilwijk operation."

15:27

You've given us information to say that there were certain places where you cleared 5-by-5-metre patches to look for potential cracking. Can you refresh my memory, please, as to how many of those peepholes that you cleared to look for cracking, and just generally speaking, where those peepholes might have been?

15:27

A. MR. LOBBEZOO: So for Arie's, so we're talking about the after one year, no readily observable cracking was noted; right?

Q. Yes.

A. MR. LOBBEZOO: So when I visited with Arie and we did the core testing, it was -- he had scraped the areas with a loader that we did the core tests at. And those were the areas that I reviewed at that time for cracks.

So that's what that would refer to.

Q. Okay. So those eight locations where you had done the cores were the same locations where you were looking for cracks?

A. MR. LOBBEZOO: Yes. 15:28

Q. Okay.

MS. MAHARAJ: Those are all my questions. Thank you so much, sir. I appreciate your information.

And, Mr. Chair, that's all I have for today.

THE CHAIR: Thank you, Ms. -- I have a bit of a freeze. Can people hear me? Sorry, my screen froze a bit. That might be on my end. So thank you, Ms. Maharaj, much appreciated.

THE CHAIR QUESTIONS THE PANEL:

Q. So I've been doing a lot of crossing off, which is good. A lot of the questions had been handled. I have a couple. 15:29

The Schmidt hammer, don't want spent a lot of time there; we spent a lot of time already there. But in connection with the base, because it has come up that

there is not a lot of information in terms of the stability of the base perhaps. We've seen the photographs, we've heard the description of what has taken place with the base. But I think, Mr. Both, you mentioned that if there is density tests done, Schmidt hammer or otherwise, if there is reasonable densities on those, that would tell you that the base has been prepared reasonably because if it wasn't, you wouldn't be able to compress the concrete enough in order to get those densities, and therefore, the base would be suspect. 15:30

Do I have that correct?

A. **MR. BOTH: Yes, sir, you have that correct. Poor base will indicate poor compressibility. When we are at 100 percent compression, we'll get to 100 percent -- when we're at 100 percent density, we'll get to 100 percent of compressive strength. When we're at 90 percent of density, we'll drop down below 80 percent of potential compressive strength. If we drop below that 70 percent of density, we'll drop below 50 percent of compressive strength. That's a function of the base. If you're trying to pack on a pillow, you just can't do that.** 15:30

Q. Thank you. That's an analogy that all of us can understand, I think.

A quick question. This may be for Mr. Lobbezoo, in terms of your experience with ag operations, dealing with permeability and compaction. If it isn't, then -- if it isn't a reasonable question to ask, then just tell me.

In terms of detecting after the fact, so you know, we're here because, you know, there's water under the bridge. It was built without permit, and now we're trying to determine will this thing stand up, will it meet AOPA. And then we've had lots of questions about, 15:31
and on an ongoing basis, if it were approved, monitoring crack control or crack remediation.

But in terms of -- I'm just trying to get a feel for, I mean, this project, others, and perhaps for the future. But in terms of detecting a problem now, so we're 18 months later, if there's significant cleaning done on surfaces and we would have some more inspections, perhaps some more testing done, who knows. But I'm hearing that there is a relatively -- and if I'm wrong, please tell me. I understand there's a 15:32
fairly high degree of confidence that we can put in in terms of the -- the stability and the quality of the RCC, and I'm just wondering about how that might compare to clay liners.

So we deal with clay liners all the time. A clay

liner is installed on a post-construction inspection. We would go and look at it. But how would we know, I guess, and over time, would it be easier to tell if there is some reason to be concerned with an RCC liner versus our standard clay liners.

So, Mr. Lobbezoo, I'll let you -- or Mr. Both, or perhaps both of you, no pun intended.

A. MR. BOTH: Do you want to go, Mr. Lobbezoo?

A. MR. LOBBEZOO: Yeah. Mr. Lobbezoo here.

So the competency of a clay liner after the fact, I mean, you could readily, during an inspection, see that it's potentially being compromised or not by how deep the cattle hooves are punching into it. 15:32

In the case of RCC, I mean, if you do get those sorts of local failures, they'll be readily apparent. But I would expect to see much more robust and -- slabs that look similar to when it was constructed for a lot longer than, say, you would with a compacted clay liner.

I don't know if that's answering your question. 15:33

Q. Yeah, I mean, I guess it is. So if I'm hearing -- if I'm understanding you correctly, if there isn't an issue now but one arises later, it will be obvious. Is that fair?

A. MR. LOBBEZOO: Yes.

Q. If there is some detection, it will require obviously some inspection?

A. MR. LOBBEZOO: Yes.

Q. And Mr. Muilwijk, just two quick questions for you. I believe you indicated, and I just want to make sure I have this right. I mean, you progressed without a permit, we know that. But I thought you indicated that in your discussions with Ms. Snowdon, in fact some preparation of some maybe Part 1 and Part 2 of the technical documents, your discussion with Ms. Snowdon, the first approval officer, was that it was going to be the Stronks' process that was going to be used for your facility. Is that true? 15:34

A. MR. MUILWIJK: Yes, correct.

Q. And that was the premise that you continued on. You didn't have a permit. It was those sort of permit conditions that were in the Stronks' file that you've always thought that you needed to meet -- in order to meet the permit that you hoped you were going to get?

A. MR. MUILWIJK: Yes, exactly. And that really started to change once Mr. Cumming took my permit over. That's really when everything seemed to -- like the whole policy stuff seemed to change, and -- like, yeah, if that answers your question. 15:35

Q. Right. I mean, that's a bit of a different issue. At

that point, now we need to figure out if that's the case, and that's what we're doing today.

And kind of a related question, though, you had picked out of four options given to you by Mr. Cumming, there were several options: Redo it, rip it out, or put something on top. But of the four options, an immediate permit denial and request for review to this Board was not the option you chose. You indicated you took option -- I may not have this right, 3 I think it was, but it was one of the four options, which was 15:36
prove that it meets AOPA or show equivalency. Is that true?

A. MR. MUILWIJK: Yes, correct.

Q. Okay. And so when there was a denial, that was the first time you knew it was going to be a denial, when you received the denial, either through phone call or mail or however you received that?

A. MR. MUILWIJK: Yes. Although considering how the process was going with Mr. Cumming, I already earlier on realized this is definitely we look toward a -- that 15:36
this wasn't going to go through. That's already why I had contacted Mr. Metheral in December. I figured I needed some help on this whole issue, let's say, and he was willing to help me with this.

Q. Okay. And my understanding is that -- and I've been

around this place a while, so that understanding comes from some internal knowledge, that if it's going to be a denial and it's based on a disagreement of information required to show that you meet, that there may be an opportunity given to you from the NRCB for a mediation or a facilitation. I'm not aware if that still exists within our -- the organization on the operation side.

But were you -- I guess so my direct question to you is were you ever given an opportunity to sort of have a mediated session with other approval officers or with somebody else to have a look at what the requirements were, what you needed to provide? 15:37

A. MR. MUILWIJK: **No.**

THE CHAIR: Thank you. Those are all my questions. Thank you, panel, and Mr. Kennedy, on behalf of the Board, for those questions.

Mr. Metheral, do you have a redirect at this point? You won't have another point. So if you have redirect, this is your opportunity. 15:37

MR. METHERAL: I have said too much already. Thank you, Mr. Chair.

THE CHAIR: That is on the record, I think, Mr. Metheral. Okay.

(PANEL STANDS DOWN)

THE CHAIR: So field services, Ms. Vance, do you have rebuttal evidence to provide?

MS. VANCE: Thank you, Mr. Chair. I've been advised that we do not have rebuttal evidence to provide.

And perhaps while I have an opportunity, I would also mention that I received Mr. Lobbezoo's CV, and we have no objection to that being entered as an exhibit.

THE CHAIR: Okay, thank you.

Now, Ms. Friend, that would be number what? 15:38

MS. FRIEND: The next number is 107.

THE CHAIR: Okay, so thank you. Thank you, Ms. Vance.

EXHIBIT 107 - CV OF JOHN LOBBEZOO

THE CHAIR: Mr. Metheral or Mr. Muilwijk, I'm not sure who -- well, if you were planning on providing closing argument, and if you are, this is your opportunity. Maybe, I mean, it is 20 to 4, and do you have an idea of how long it is? I mean, if it's not too, too long, I think we just continue, but if it's 15:39 lengthy, then we may want a break.

THE COURT REPORTER: Mr. Chair, I wouldn't mind a break. We've been going over two or three hours.

THE CHAIR: Yeah, it has been. No, let's do that, that's fair. Thank you, Ms. Gerbrandt. Request

granted. We don't -- we need the court reporter for the remainder; we better keep her happy.

Okay. So let's take ten minutes, if that works. So ten minutes to 4 we'll return. Thank you.

(ADJOURNMENT)

THE CHAIR: Welcome back, everyone. It is just ten minutes to 4. We did not set time limits as we have done in other hearings, and so we need to be pretty flexible because we didn't do that. But I wouldn't mind getting an indication because if it's three hours, then maybe we do need a limit. 15:52

Mr. Metheral -- is he back? Oh, gee, maybe I have to repeat that. Oh, there you are.

Mr. Metheral, did you just hear what I was talking about? You did.

MR. METHERAL: Yes, I did.

THE CHAIR: How long did you think you're going to need?

MR. METHERAL: This is for closing arguments?

THE CHAIR: Right. 15:52

MR. METHERAL: They said I couldn't refer to my five-page document. They made me reduce it down to (audio glitch) bullets.

MR. KENNEDY: Just to be clear, that's your group told you you couldn't refer to your five-page

document?

THE CHAIR: Oh, I was thinking who told him that. Okay. So how long do you think you'll be?

MR. METHERAL: I've got five points I would like to make.

THE CHAIR: Oh, no, that sounds like it's going to be reasonable. And Ms. Vance?

MS. VANCE: It's 20 minutes if I speak really slowly, so...

THE CHAIR: Okay. All right. Perfect. So, Mr. Metheral, please proceed. 15:53

MR. METHERAL: First of all, Mr. Chairman, we would like to thank the Board for allowing the Muilwijks the opportunity to review their file. As indicated in their request for review, they believe there were some unsettled issues. We trust that the testimony and the submissions from Mr. Lobbezoo in his two reports to the NRCB and the testimony from Mr. Both help you in your decision-making.

We would ask that the Board consider that John Lobbezoo has established that roller compacted concrete can meet AOPA guidelines, and we hope that his second report further illustrates that this is a -- or we hope that his second report further emphasizes that those requirements are met. 15:53

We also ask the Board to have a quick look at the environmental risk screening tool calculations. We understand that the distance to the catch basin has been adjusted, that we have looked at the depth to the water table for possible adjustments, but we would ask that the Board consider the testimony from Mr. Lobbezoo on soil texture and that the environmental risk screening tool be adjusted accordingly, moving the -- or moving the category from coarse material to fine text -- sorry, to medium texture. 15:55

We would acknowledge that Mr. Chair's comments yesterday, we think he has addressed -- identified something very key. There does appear to be to us that there is a small policy change that affected Mr. Muilwijk. In his early proceedings with Mrs. Snowdon, the NRCB approval officer was quite helpful and easy to work with, and it seemed like the process for getting his roller compacted concrete liner was going to be easy and efficient.

And regardless of the change -- or from the 15:55 apparent changes in position, with the second approval officer, we understand the position the Board is in in determining how they'll take this changes an NRCB policy. We understand the difficulties of that decision.

We do thank the Board for allowing us the public record, access to the public record. It is -- it was significant, although a huge amount of information to go through, but it does -- it did lead to some very beneficial parts for us.

In conclusion, we do appreciate the Board's efforts to address all of the outstanding issues that the Muilwijks have. Thank you.

THE CHAIR: Thank you, Mr. Metheral, much appreciated. 15:56

Ms. Vance?

MS. VANCE: Thank you, Mr. Chair.

So in this hearing, I've walked a bit of a difficult line, and you certainly identified that, because there is the decision of the approval officer, and then there is a lot of new evidence and new issues that sort of, I would say, fall outside that. So my closing tries to walk a respectful line between those.

As for the decision of the approval officer, our position has always been that the decision summary and 15:57 the technical documents speak for themselves.

Groundwater protection is one of the key things that defines the NRCB as a regulator. And certainly Mr. Metheral provided the Board with information about RCC. Mr. Lobbezoo provided information about RCC, and

Mr. Both as well. This has been very interesting, very helpful. Of course some of it is new but nonetheless I believe will be helpful to the Board making an informed decision.

I think that characterizing this hearing as a pro-RCC, an anti-RCC hearing would vastly oversimplify the issues and would not do justice to all the different perspectives that have been brought here today.

Having listened carefully to all the witnesses, I actually think we're not too far apart. I think there's maybe some divergence on the ultimate opinion about suitability for RCC at this particular site, maybe not even. Maybe it's just a matter of sufficiency of information. But, you know, now we have a bit more information, perhaps fewer assumptions, and more transparent methodologies. 15:58

At field services, we certainly don't dispute that RCC is a useful product that has been around for decades. In a confined feeding operation setting, RCC has all sorts of benefits for animal health, economics, runoff. You can see that in the project by Dr. Steve Hendrick, which was commissioned by Alberta Agriculture and Forestry. We haven't really discussed that; it's Exhibit 82. Dr. Hendrick is a veterinary 15:58

epidemiologist at the Coaldale Veterinary Clinic, and he and his team study the impact of amended feedlot surface, including RCC, on animal welfare and environmental and economic sustainability. And if I refer to it again, I'll just call it the "AF paper," if that's all right.

Now, what we don't know is how any given mat of RCC performs as a liner under AOPA. This is sort of new stuff. It's not standardized. And, frankly, what we know in 2021 may not be the same that we knew in 1985 or 2006 or 2018. Mr. Metheral talked about evolving mixes in his presentation today, and I think that's demonstrative. 15:59

As well, we have the Technical Advisory Group, or "TAG" for short, doing a literature review to investigate the possibility of developing a guideline for using RCC as an AOPA liner. And just a couple of months ago -- well, five perhaps, their conclusion was there is not enough information out there to make a guideline. That's at Exhibit 81. 16:00

So the way I see it is that now we know better what we don't know.

So then how do we process applications at the NRCB that are proposing a liner made out of a material for which we don't have standardized mixes?

So let's just walk through a hypothetical -- somewhat hypothetical situation. You're an approval officer at the NRCB, and today you receive an application for an RCC liner intended to meet AOPA's groundwater protections. The approval officer looks at the application. The applicant brings its case, and the approval officer makes a decision.

Now, I think it's important for clarity to understand that the approval officer is not in the role of granting permits. He or she is in the role of 16:01 processing permits. He or she is also not especially in the role of assisting applicants or writing their application for them. Mr. Muilwijk indicated he felt he was relying on Ms. Snowdon to help him out. And, you know, frankly, this is, I think, what the AF extension specialists used to do before they were discontinued. And I actually don't know how that gap is being filled, but I thought I would make that observation.

So as a regulator created by and governed by 16:01 legislation, the NRCB always starts with that legislation. The standards reg under AOPA has groundwater protection rules. So first forming your storage facility or collection area, you need to have a protective layer or a liner. Section 9(5) is for

protective layers. I think we all understand that's not what this application is about, but it talks about naturally occurring liners and hydraulic conductivity and thickness.

Section 9(6) is for liners. Liners are constructed, and I don't think that's under dispute. But if you're interested, there is a definition of liner within the standards reg. They can be constructed out of natural materials or manufactured materials. 16:02

The section mentions concrete, steel, and, quote, "other synthetic or manufactured materials," end quote. And then all these other proposed equivalents are compared against the hydraulic conductive for compacted soil at different thicknesses, depending on what kind of facility it is.

So the sort of what I would call predictable layers or liners are made of naturally occurring materials and compacted soils, and for those, we actually have the numbers right there in the section. 16:03 Anything other than soils-based materials are going to be what I think the approval officers lovingly called "alternative liners." So that includes concrete and steel and synthetics. And in fact the application forms have been developed to have pages dedicated to

those specific alternatives.

Concrete is fairly common. You can have your concrete engineered or not. And if your concrete liner is not engineered, the Technical Advisory Group came out with a guideline, which we have seen many times in this hearing, Exhibit 77.

So this applies to concrete. And on that Exhibit 77 at page 2, you will see a green outlined box that talks about critical factors. And the way I view this as a lawyer is that it's kind of an evidentiary shortcut proposing to use concrete as a liner when it's not engineered. So you show what you need to for the right category, and likely or not, you're ready to go. TAG I think has done your work for you, if you like. 16:04

But for all other kinds of alternative liners such as RCC, there is no technical guideline, so the NRCB needs to take application -- each application anew.

So back to you as a hypothetical approval officer. What do you do for something like RCC? Because we are getting these, I think, on a fairly frequent basis. 16:04

So you require it to be engineered. Cement mix, the aggregate mix, the compaction method, I think we are all now familiar with the various factors that go into this. You compose a series of conditions. For instance, requiring an engineer to be present or maybe

just to supervise during installation and perform tests on site and then a report post-construction. And that is in fact what I believe happened with LA18053B.

So now a twist. The RCC has already been installed. So the recipe, we don't really have much information about that. I don't know if it was -- we don't know if it was designed by an engineer. The evidence is that there was no engineer on site to do compaction tests or speak to the compaction and leveling of the bed. 16:05

So what do you do? This may happen. So you do your homework. Perhaps you chat with your colleagues. You give the applicant an outline of what kind of information you might want to see. You give the applicant some options, and probably you give the applicant every opportunity to improve and augment their application.

So an example of this, I think in the case at hand, is that revision of the Wood report from October 29th to November 6th. There was an 16:06 opportunity. In fact there was an opportunity from May, "Give us a report." "Okay. Are you happy with this report?" "You can give us another report." You can't tell them what to do or put in their application because that's not what you do as a regulatory

decision-maker.

And when I asked Mr. Cumming whether an application that has already installed RCC would ever satisfy AOPA, his answer was "I hope so."

And I just wanted to have a quick word that guided AOPA -- pardon me, approval officers. And these principles relate to consistency and fairness. It is reasonable to compare LA18053B and LA19036 and ask why they were different outcomes.

So we have two principles, I think, which are 16:07
consistency and independence. Of course the NRCB strives for consistent decision-making. Consistent decision-making helps all stakeholders, applicants, complainants in a compliance situation, municipalities, neighbours, and of course NRCB staff. It is tricky when every situation is different and every application is different, but this is why the NRCB communicates among its staff, we have meetings, we discuss, sometimes we develop policy if we get to a critical mass of discussion, when we can land on what that 16:08
policy might be.

And for clarity, there is no policy on RCC because I think maybe there was a misunderstanding about that.

Prior similar decisions do provide important context for today's decisions. True inconsistency I

believe is rare, as often there are distinguishing features of one from another, but it is important to know what has come before.

And just for clarity on the record, I would point out that LA17038 was a denial. If you're looking for reasons underlying the granting of LA18053B, I suggest you may have to follow it through to LA18053. I think you will find the reasoning related to the RCC in that decision summary.

And the LA18031 was quickly superseded by LA18031A, where the applicant changed actually from RCC to what I would call normal concrete. So I just wanted to clarify that up. 16:09

The Board decision on Stronks at Board Decision 2019-03 did go to review, as I think Mr. Metheral helpfully pointed you. But when you look at it, you will see that the review was limited to Condition 18, which dealt with the natural catchment area; RCC was not an issue.

You know, from my point of view, I'm not sure it takes a deep probe to distinguish LA19036 from LA18053B, just for the fact that in LA18053B, the RCC had not already been laid. And I think we have been over that ground enough that I don't need to expand on that. 16:09

So that's consistency. It's an important principle, and I'm sure Mr. Cumming would agree with me on that for the NRCB.

The other steering principle is that each approval officer is an independent statutory decision-maker. Now, that may mean -- may seem sort of contrary to what I was just talking about consistency and making sure we make consistent decisions. But actually it's complementary. So for independents, this means an approval officer making a decision in 2018 cannot bind 16:10
an approval officer making a decision in 2021. And I provided on Friday a case to Mr. Muilwijk and Mr. Metheral called *Shuttleworth and Ontario*. I'm happy to provide it, but it just stands for the general proposition in law of independence of statutory decision-makers. The citation for that is 2019 ONCA 518, and you would be wanting to look at paragraphs 26 to 34. That's an Ontario Court of Appeal decision on independence.

An approval officer also cannot be forced by 16:11
written policy to make a decision one way or another. In my job, I find that those operational policies are so handy to fill in the gaps that are left by what I would call aging legislation. They don't answer every question, and they do allow for independence.

In fact, in NRCB operational policies, you will always see a blurb near the beginning about NRCB staff retaining discretion to modify policy when its strict application would be clearly unfair or in other necessary and appropriate circumstances.

The approvals policy, which I don't even know if it's in evidence, but it would be page 3, pdf page 8. Almost any policy you look at, I'm happy to provide citations for those.

This is known in law as the rule against fettering. And the case I would provide in support of that is called *Stemijon and Canada*, and it is -- its citation is 2011 FCA 299. And you're probably going to look around paragraphs 58 through 61. Again, I did send this case to Mr. Metheral and Mr. Muilwijk on Friday. And that's -- I haven't been able to find that either of those cases have been taken to the Supreme Court, so I think -- anyway, I think that's there. 16:12

So the NRCB -- if we have to have a position on RCC, it's not that RCC can't be used as a liner under AOPA. I think our position is that in cases where a liner is proposed that is not soils-based, it is up to the applicant to show that the alternative will meet AOPA's protection standards, including for groundwater. 16:12

I think it's important for not only the Board, but also our fellow participants to recognize that the NRCB as a regulator is in a bit of a delicate position. Approval officers and inspectors have jobs to do under the legislation. We have seen a recent influx of applications proposing RCC as a liner. And, frankly, that makes sense given its popularity.

At this time RCC does not clearly fit into that non-engineered concrete liner technical guideline, and we are not aware of any standards for RCC in terms of meeting AOPA groundwater protection. 16:14

So until we have better information, it is difficult, it is case by case, and unfortunately it has to be.

I feel like we probably need further targeted research. It's possible that a certain formula mix installed under certain conditions might be effective as a liner under AOPA.

And just to finish off, I thought that I would beg the Board's indulgence to just talk a bit about my hopes coming out of this review. 16:14 As we've mentioned, the approval officer takes no position on whether the Board should overturn his decision or uphold it. The approval officer did offer some potential conditions to consider if the Board is inclined to overturn.

On a broader scale, of course NRCB field services does not expect the Board to issue that standardized set of RCC guidelines. Presumably they need to come from Agriculture and Forestry and from research. And I just -- I don't think we have that yet.

But those are -- those are my submissions, unless the Board has any questions for me.

THE CHAIR: Thank you, Ms. Vance. Any questions from the Board? Panel members? Ms. Maharaj?

MS. STUART: I have none. 16:15

MS. MAHARAJ: Could you just give me again, Ms. Vance, your case with respect to fettering? I got the citation, but not the name.

MS. VANCE: I have no idea how to pronounce it. It's spelled *Stemijon*, S-T-E-M-I-J-O-N. I believe it's a tax case, which is why it would be in the Federal Court of Appeal.

MS. MAHARAJ: And it's against?

MS. VANCE: Canada in some form.

MS. MAHARAJ: And Canada? 16:16

MS. VANCE: There's a long -- it's probably Revenue -- CRA, something like that. It was a director, I think, under the CRA making decisions in relation to an interpretation bulletin.

MS. MAHARAJ: Okay, thanks. That's it.

THE CHAIR: Thank you.

Mr. Kennedy, do you have anything?

MR. KENNEDY: No, I have nothing. Thank you.

Thank you, Ms. Vance.

THE CHAIR: All right, thank you, Ms. Vance.

Mr. Metheral, did you have any reply to that, to Ms. Vance's final argument? I mean -- and I realize there's not a lot of time. I mean, you just heard it now, but...

MR. METHERAL: I would defer this opportunity to Mr. Muilwijk. 16:17

THE CHAIR: Okay, there you go. Thank you.

MR. MUILWIJK: I would just like to take this time to thank the Board as well for giving me the chance to bring this all forward and thank everyone for being part of this, and hoping that we can move forward. Thank you.

THE CHAIR: Thank you very much, Mr. Muilwijk.

Okay. Well, I think we are now at the close of the hearing. And so just a couple of final remarks. 16:17 The Panel -- on behalf of the Panel, I would like to thank everyone for your participation. And, you know, no doubt these proceedings are a little intimidating. And in particular, Mr. Muilwijk, Mr. Metheral, I would like to thank you for a job well done in your first

hearing experience, and to your witnesses, Mr. Lobbezoo and Mr. Both.

And thank you, field services, a constructive and professional appearance. Ms. Vance, Mr. Cumming, and Mr. Cunningham, the Board appreciates your participation for obvious reasons.

And Ms. Kaminski, Ms. Taylor, they have been at this for two full days, document management. They are becoming quicker and quicker. It's almost like it's not a human being behind that, exhibits fly up. So thank you very much. 16:18

Ms. Gerbrandt, a long day and a short break that I gave you, so my apologies. I really would like to thank you. And if you could pass my thanks along to Ms. DiPaolo as well. You folks are amazing, and we really appreciate everything you do for transcript production.

Clearly we received a lot of information, and it is helpful. The Panel will consider all of it, including the submissions we've got to date, when we're reaching our decision, and we'll provide that decision to all parties in the form of, you know, a written decision report supported by reasons. 16:18

The Board has a long-standing performance target, it's not statutory, a performance target for AOPA

decisions to meet 30 working days, so six weeks, upon the close of the hearing.

We may have a couple of questions. I don't know if that would really hold up our decision. And we also have some information on testing that has just come in, but I would hope that we would make this decision as well, like we have with all of our other decisions, it has been six weeks.

So thank you very much, everyone, for your participation. It's been a couple of long days, but you've done great, and the Panel really appreciates the work that you've put into it. And we also appreciate the gravity of the decision that we have for the Muilwijks. So know that we take that responsibility very seriously. 16:19

Thank you again. Have a good evening, everyone, and the hearing is now closed.

(PROCEEDINGS ADJOURNED AT 4:20 P.M.)

PROCEEDINGS CONCLUDED

Certificate of Transcript

We, the undersigned, hereby certify that the foregoing pages 274 to 498 are a complete and accurate transcript of the proceedings taken down by us in shorthand and transcribed from our shorthand notes to the best of our skill and ability.

Dated at the City of Calgary, Province of Alberta, on April 21, 2021.

"Donna Gerbrandt"

Donna Gerbrandt, CSR(A)
Official Court Reporter

"Deanna DiPaolo"

Deanna DiPaolo, CSR(A)
Official Court Reporter

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