NRCB | Natural Resources Conservation Board

# BOARD DECISION

## 2021-03 / LA19036

Review of Decision Summary LA19036

Arie and Willemina Muilwijk

May 25, 2021

The Board issues this decision under the authority of the *Agricultural Operations Practices Act* (AOPA), following the Board review hearing of Decision Summary LA19036.

## BACKGROUND

On January 14, 2021, the NRCB approval officer issued Decision Summary LA19036, denying an application to convert a swine confined feeding operation (Existing CFO) to a beef feeder calf CFO expanded to 3,000 calves (Proposed CFO). The reasons for his decision were documented in Decision Summary LA19036. The Existing CFO is owned and operated by Arie and Willemina Muilwijk (the Muilwijks) and is located at NE 10-9-27 W4M in the Municipal District of Willow Creek.

Pursuant to Section 20(5) of the *Agricultural Operation Practices Act* (AOPA), a Request for Board Review (RFR) of Decision Summary LA19036 was filed by the Muilwijks within the 10-day filing deadline of February 4, 2021, established by AOPA.

Under the authority of section 18(1) of the *Natural* Resources *Conservation Board Act*, a division of the Board (Board or panel) consisting of Peter Woloshyn (chair), L. Page Stuart, Indra L. Maharaj, and Earl Graham was established to conduct the review.

The Board met on February 16 and 17, 2021 and, in a decision letter dated February 18, 2021, advised that it had reviewed the RFR and determined that a review hearing was warranted with respect to four specific issues. The Board's full decision report, RFR Decision 2021-02, followed on February 24, 2021. In its decision report, the Board re-stated the four specific issues from its decision letter that it would consider at the hearing and requested a submission from Field Services with respect to those issues. The Board found that the other issues raised in the Muilwijks' RFR did not merit further review at the hearing.

The Board also directed that Field Services make the complete application record available by March 26, 2021. The application record was received on March 19, 2021. The Board directed that written submissions by all parties were to be filed with the Board no later than April 8, 2021. Submissions were received from John Green and Terri McCullough on April 7, 2021 and from the Muilwijks on April 8, 2021.

In its Decision RFR 2021-02, the Board advised that a virtual hearing using the Zoom platform would commence at 9:30 a.m. on April 20, 2021 and, in the event the hearing required additional time, parties should be available on April 21, 2021.

The hearing was conducted virtually using the Zoom platform on April 20 and 21, 2021. Parties to the review and their representatives attending the hearing are identified below:

| Parties to the Review | Counsel/Representative |
|---|---|
| NRCB Approval Officer and Field Services<br>• Andy Cumming, Approval Officer<br>• Scott Cunningham, Environmental Specialist | Fiona Vance, Counsel |
| Arie and Willemina Muilwijk<br>• Arie Muilwijk<br>• Cody Metheral, Linkage Ag Solutions<br>• John Lobbezoo, Wood Environmental and Infrastructure Solutions<br>• John Both, Rock Solid Concrete Products | Cody Metheral, Linkage Ag Solutions |
| MD of Willow Creek<br>• Cindy Chisholm | No appearance |
| Dean and Hannah Brauer | No appearance |
| John Green | No appearance |
| Terri McCullough | No appearance |

Bill Kennedy participated in the hearing as counsel for the Board. Additional staff support was provided by Laura Friend, Manager, Board Reviews, and Sylvia Kaminski and Carolyn Taylor, document management.

## HEARING ISSUES

Board Decision RFR 2021-02/LA19036 identified four issues for consideration in the review:

Issue 1 Whether the roller compacted concrete (RCC) liner associated with application LA19036 meets the standards required in AOPA section 9(6)(c).

Issue 2 Whether the potential permit conditions identified in Decision Summary LA19036 for the catch basin and fly control are appropriate.

Issue 3 A determination of the risk associated with the existing water well in the yard.

Issue 4 A determination of the deemed capacity to confine livestock at the confined feeding operation pursuant to Section 18.1 of the *Agriculture Operation Practices Act.*

Prior to the hearing, the approval officer conceded the deemed capacity for the Proposed CFO is 100 sows farrow to finish under AOPA section 18.1(2)(b). The Board notes that this matter

has been resolved prior to the hearing and, as such, no determination on Issue 4 is required from the Board in this regard.

# BOARD DELIBERATIONS

## Context

The Muilwijks' application to convert the Existing CFO into the Proposed CFO included their proposal that they intended to install roller compacted concrete (RCC) as a liner in three uncovered pens and a covered shelter. The application for a permit was ultimately denied by the NRCB; however, the Muilwijks had already placed RCC in the three uncovered pens and the covered shelter.

While on-going compliance and enforcement issues relating to this file are not in front of the Board in this hearing, the Board cannot overstate the importance to operators, including the Muilwijks, of obtaining a permit prior to constructing facilities regulated under AOPA.

The Board notes that it received written submissions from the Municipal District of Willow Creek, Dean and Hannah Brauer, John Green, and Terri McCullough. None of these parties appeared in person. However, their written submissions have been received, reviewed, and considered by the Board in its deliberations. Where and if necessary, the Board has referred to these submissions in its deliberations.

## Hearing Issue 1: Whether the roller compacted concrete (RCC) liner associated with application LA19036 meets the requirements of section 9(6)(c), AOPA Standards and Administration Regulation (Standards Regulation).

The Board accepts there is significant experience in the formulation and installation of RCC in Alberta. While RCC is a product used in many construction applications, including as an amendment for feedlot pen floors, the key question in front of the Board is whether the installation of RCC as a feedlot pen liner at the site of the Muilwijks' Proposed CFO meets the requirements of AOPA Standards and Administration Regulation (Standards Regulation), section 9(6)(c), which states, in part:

> *9(6) The liner of a manure storage facility and of a manure collection area, if constructed of compacted soil or constructed of concrete, steel or other synthetic or manufactured materials, must provide equal or greater protection than that provided by compacted soil…*

*(c) 0.5 m in depth with a hydraulic conductivity of not more than 5 x 10-7 centimetres per second for a solid manure storage facility or solid manure collection area.*

It is undisputed that two previous NRCB permits were issued which allowed for an RCC installation as meeting the requirements of section 9(6)(c) of the Standards Regulation: the Hutterian Brethren of Spring View (Spring View or LA18031) in July 2018 and Stronks Feedlot Ltd. (Stronks or LA18053) in January 2019 (collectively, the Previous Approvals). While RCC as a liner was permitted for Spring View, it was not ultimately installed; however, RCC was installed as a liner in the Stronks case.

While it is the Board's view that each application must be reviewed against AOPA's legislative requirements on its own merit, a balance must be achieved between reliance on precedent and the regulatory pillar of consistency in decision-making. To apply the conditions of a related application without consideration of the particular application before it would be a failure of the Board's obligation to undertake a proper administrative process. Toward this end, as the Board noted in Sunterra Farms Ltd. *(*Decision 2013-02), with any new issue, "*care must be taken as the results of the decision will provide some level of guidance for others parties considering or responding to a similar application*."

Having regard for evidence from Mr. Both, Mr. Lobbezoo and two previous NRCB approvals, the Board finds that RCC installed properly can meet AOPA groundwater protection standards. Thus, the Board sought to determine whether the Muilwijks' RCC installation met the requirements of section 9(6)(c) of the Standards Regulation, with due consideration being given to the installation criteria previously established by the NRCB and whether further testing is required to determine RCC integrity.

In deciding whether the RCC liner installation at the Muilwijks' Proposed CFO meets section 9(6)(c) of the Standards Regulation, the Board considered the following questions:

1. What installation conditions were required with respect to the installation of RCC liners in previous NRCB permits?

2. Did Muilwijks, and their experts, provide the Board with sufficient evidence to confirm that they followed the installation conditions that had been previously accepted by the NRCB and found to meet section 9(6)(c) of the Standards Regulation?

3. What, if any, consideration must be given to the impact of cracking in Muilwijks' RCC liner installation?

## 1. What installation conditions were required with respect to the installation of RCC liners in previous NRCB permits?

With a view to understanding the parameters that resulted in previous permits being issued for RCC liners, the Board reviewed the proposed installation criteria for the RCC liners in Permits LA18031 and LA18053. In those applications, the following were the common elements with respect to the proposed installation of RCC:

- the bed for the liner must be level and compacted, before the RCC is installed;
- the RCC product must be placed on the bed with an even thickness of at least 7 inches (0.18 metres) and at least 6 inches (0.15 metres) when compacted;
- the RCC must be properly compacted around transition zones (stock waterers, the feed bunk apron, the pen entrances, fence posts, and any other objects that penetrate the RCC), using a hand packer around posts and with a small vibrator compactor around stock waterers, feed bunk aprons, and pen entrance areas;
- the RCC must be covered immediately (e.g., with straw) after it is compacted, and for a sufficiently long period, to ensure proper curing; and
- the final compaction must reach at least a 92 per cent compaction density.

The Board observes that the approval officers' respective permit conditions in the Previous Approvals, as well as the supporting explanations in the related decision summaries, are detailed and clear. Of note is an acknowledgement, included in both decision summaries, that describes the RCC liner in context of Technical Guideline Agdex 096-93:

> *…the proposed 0.15 metre (6") thick RCC liner differs in that the Technical Guideline Agdex 096-93 – Non-Engineered Concrete Liners for Manure Collection and Storage Areas – requires a concrete strength of 30 MPa at 28 days for outdoor solid manure storage facilities. However, the hydraulic conductivity of the RCC is equivalent to, or better, than the requirements under section 9(6)(c) Standards and Administration Regulation which requires 0.5 metres of compacted soil with a hydraulic conductivity of 5 x $10^{-7}$cm/sec for a solid manure storage facility. I therefore consider the RCC to be an acceptable liner to provide groundwater protection.[Emphasis added.]*

*Further, a number of installation parameters are included in the decision summaries for the Previous Approvals that relate to establishing the performance of RCC liners, with a specific reference to the expected strength and hydraulic conductivity of the RCC:*

*The RCC should have a minimum strength of 10-20 MPa. This would result in a hydraulic conductivity similar to conventional concrete (in the range of 1 x $10^{-9}$ cm/sec).*

The Board finds that the Previous Approvals state that an RCC liner, properly installed, is able to meet hydraulic conductivity requirement of the Standards Regulation, particularly section 9(6)(c).

Mr. Muilwijk stated in his evidence before the Board that he informed the initial approval officer that he was familiar with the installation parameters set out in the Stronks application pertaining to the RCC liner, and that those parameters resulted in an approval being granted by the NRCB. He also stated that he and the initial approval officer had numerous conversations that supported his understanding that, as long as he was able to install the RCC liner in the same manner as Stronks, then he would be given an approval for his Proposed CFO with the proposed RCC feedlot pen liner. The following are excerpts from Mr. Muilwijk's evidence to the Board that reflect his understanding:

*And Part 2 we [Mr. Muilwijk and the [initial approval officer] filled in in [the initial approval officer's] 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 [the initial approval officer'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.* [Mr. Muilwijk, Hearing Transcript April 21, pg. 304, lines 4-14].

*So [the initial approval officer] 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. 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."* [Mr. Muilwijk, Hearing Transcript April 21, pg. 304 line 20 – pg. 305 line 1].

The Board confirms that the applicant-completed portion of Part 2 Technical Requirements referenced by Mr. Muilwijk and filed with the Board on October 1, 2019, does include details of the proposed RCC liner:

> *6"-7" of roller compacted concrete to make a durable liner, professionally installed*

It appears to the Board that the initial approval officer was aware that the Muilwijks were proposing to install RCC as a liner given the documented communications, including the following:

> *Attached is a picture with a general layout of things. The 3 corrals are all 100' wide, 120' long. These will have a RCC liner. The covered shelter will be around 260' long by 48' wide. Hopes to have a RCC liner, covered building.* [Exhibit 21, September 16, 2019 e-mail from the Mr. Muilwijk to the initial approval officer].

The Board reviewed evidence recorded in the NRCB database, and provided by Field Services as part of the record, relating to conversations between Mr. Muilwijk and the initial approval officer in this same time period, and identified the following excerpts as relevant:

> *…if the RCC is constructed in a way that doesn't meet our requirements we won't be able to permit it. [Mr. Muilwijk] said he will be working with John Lobbezoo to ensure that it's done properly, and that the contractor he is using has worked with the NRCB before and is aware of the requirements….* [Exhibit 19, NRCB database entry by the initial approval officer, September 25, 2019]
>
> *… [Mr. Muilwijk] didn't like the idea of having to go to notice again, which would reduce the potential of him being able to lay the RCC liner down in ideal weather. I emphasized that he cannot lay that RCC down without a permit, and that potentially even with the existing application he may not receive the permit in time, although I would do my best to process it quickly.* [Exhibit 19, NRCB database entry by the initial approval officer, October 24, 2019]

Of note, the initial approval officer makes reference to Mr. Muilwijk working with Mr. Lobbezoo to ensure the work is done properly, as well as making reference to a contractor who has previously worked with the NRCB and is aware of the requirements for RCC. The Board finds it reasonable to conclude that the initial approval officer understood these references to be to the previous approvals for RCC. Further, the Board see no evidence of the initial approval officer objecting to this information, other than reminding Mr. Muilwijk that he must not construct without a permit.

2. Did Muilwijks, and their experts, provide the Board with sufficient evidence to confirm that they followed the installation conditions that had been previously accepted by the NRCB and found to meet section 9(6)(c) of the Standards Regulation?

The Previous Approvals include a commonly defined stipulation in NRCB permits; that the permit holder provide the NRCB with a written construction completion report for the new feedlot pens, stamped and signed by a professional engineer certifying that the required construction parameters have been met. The Board notes that Mr. Lobbezoo confirmed that he was not in attendance during the RCC installation. However, in response to a requested undertaking at the hearing, Field Services stated that there is no guidance in the NRCB Approval Policy as to when professional engineers should be on site during construction.

The Board accepts that Mr. Lobbezoo was familiar with the installation of the Stronks RCC liner and that he had completed the Stronks substantial completion report prior to the Muilwijks' RCC installation. Further, it is undisputed that Sub-Terrain and Prairie Stone Concrete, the contractors responsible for the Muilwijks' installation, were the contractors that installed the Stronks RCC liner. The Board also accepts the evidence of Mr. Lobbezoo that both Sub-Terrain and Prairie Stone Concrete are reputable experienced contractors and familiar with the preparation and installation of RCC. Mr. Lobbezoo testified, and the Board accepts, that he had been on the Muilwijks' site doing borehole work prior to the RCC installation. Additionally, the Board accepts that Mr. Lobbezoo spoke to both Mr. Muilwijk and to the owners/operator of Sub-Terrain prior to the Muilwijks' installation to provide guidance to Sub-Terrain with respect to the RCC installation for the Proposed CFO, and that he spoke to them both after the installation to review the construction activities that had taken place.

*Characteristics and preparation of the surface underlying the RCC installation*

In support of the assertion that the bed was level and compacted, the Board also heard the expert evidence of Mr. Both. The Board accepted the evidence of Mr. Both as an expert in the field of concrete preparation and placement. Mr. Both stated that one can extrapolate whether the bed surface under the RCC was level and compacted by assessing the density of the installed RCC. If the bed was either not level or insufficiently compacted, or both, the appropriate density would not be achieved.

The evidence of the density of the installed RCC liner, as measured by Wood Environment and Infrastructure Solutions, was accepted by the Board on its face, and showed the density of the eight cores taken after the installation was complete. Each of the cores was measured to have a density that was between 99.8 and 100.8 per cent of target, noting that the target density was stated in the same document to be 2400 kg/$m^3$ [Exhibit 53, Concrete Core report].

Mr. Lobbezoo and Mr. Both provided the Board with their expert opinions that the installed RCC exceeded the 92 per cent of target density set out in the Stronks approval. The Board accepted these expert opinions and finds that the RCC liner installed by Muilwijks exceed the 92 per cent of target density parameter.

### *Supply of concrete*

Mr. Muilwijk's submission is that he followed the installation parameters that were accepted by the Board in Stronks, even to the extent of using the same contractors. The Board heard evidence that Prairie Stone Concrete prepared the concrete mix for Stronks and was contracted to do the work on the Proposed CFO. There is no evidence to suggest that a different concrete mix was prepared by Prairie Stone Concrete for the Muilwijks' RCC than for the Stronks' RCC. However, the evidence was equally clear that the mixes for concrete are viewed as proprietary in the concrete industry so obtaining the mix for the Stronks' installation and the Muilwijks' installation in order to compare them is likely not feasible. The Board accepts, based on a balance of probabilities, that the concrete mix was materially similar for both installations.

Mr. Both offered expert testimony regarding the significance of compressive strength testing and density testing in the evaluation of the hydraulic conductivity parameters of RCC [Hearing Transcript, April 21, p. 456-7].

The Board accepts the expert evidence that compressive strength and density are quantifiable specifications that can be relied upon in order to determine functionality of the concrete mix. If these two parameters, compressive strength and density, are materially similar as between the Muilwijks' RCC installation and the Stronks' RCC installation, the Board has determined that it would be reasonable to conclude, on a balance of probabilities, that the hydraulic conductivity properties will be similar as well.

### *Depth of RCC after compaction*

The Previous Approvals both had either a proposed or proved depth of at least six inches of RCC after compaction.

The eight core samples taken from the Muilwijks' RCC installation demonstrated that the RCC as installed had a depth of at least six inches of RCC after compaction.

The Board is prepared to accept the test data as demonstrating that the RCC installed at the Proposed CFO has a depth of at least six inches after compaction.

*Compaction around the transition zones*

Mr. Muilwijk stated that the areas around transition zones and extrusions were compacted with a small packer.

Mr. Lobbezoo stated that he instructed Sub-Terrain to hand pack the areas around transition zones and extrusions.

The Board has no evidence to contradict the testimony of Mr. Muilwijk and Mr. Lobbezoo and finds, on the balance of probabilities, that compaction in the transition zones was completed as stated.

*Straw coverage to ensure proper curing*

Mr. Muilwijk provided the Board with photographs illustrating the straw that he placed on the RCC to maintain its heat and humidity to induce proper curing. Although the photographs are not time or date stamped, Mr. Muilwijk testified that he placed the straw within 24 hours after the installation of the RCC.

Mr. Both testified that the effectiveness of the curing environment can be assessed by evaluating the final product for compressive strength and density: densities through coring, and compressive strength through destructive testing [John Both, pg. 383 line 21 – pg. 384 line 5]. The Board accepts the expert evidence of Mr. Both that proper curing can be extrapolated from compressive strength and density testing of the installed product. The Board finds that the testing data for compressive strength is necessary for completion of its analysis of the hydraulic conductivity but accepts, on the balance of probabilities, that Mr. Muilwijk covered the RCC installation with straw as he testified.

3. What, if any, consideration must be given to the impact of cracking in RCC liner installation?

Mr. Both offered expert testimony regarding the significance of potential cracking on the hydraulic conductivity of an RCC installation. He stated:

> *… regarding all of the testimony that I have heard, the greatest factor involved, and we heard that through Mr. Cunningham yesterday [when he] had made that statement through his calculations, is that cracks will contribute the greatest amount of hydraulic conductivity.* [Hearing Transcript April 21, 2020, pg. 108, line 14-23]

The April 9, 2021 Wood Report (Wood report, Exhibit 98, pg. 3) includes comment on the correlation between cracking, temperature changes, potential for infilling, and hydraulic conductivity, when he said:

> *Invariably, cracks in the RCC mat become infilled with a combination of bedding material, manure, and soil. Theoretically, during the coldest months, these cracks would be the widest in conjunction with the lowest temperatures. Incidentally, the permeability would also be the lowest during this time, as any liquid on or in the RCC or cracks would be frozen, and not permeating through the RCC or cracks. During the warmer months, the material in the cracks would compress as a result of thermal expansion of the RCC, effectively sealing the cracks and reducing permeability through the cracks to a minimum.*

The Board notes that the average permeability of a 0.15 m thick RCC installation appears to be commonly referenced as generally below 1 x $10^{-9}$ cm/s:

> *Permeability through RCC and typical hardened concrete is widely documented, and generally below 1 x $10^{-9}$ cm/sec. Considering a 10 m by 10 m section of RCC mat containing one 20 mm wide crack in both directions (the cracked area having an assumed permeability of 1 x $10^{-4}$ cm/sec), and a conservative estimate of 1 x $10^{-9}$ cm/sec for RCC, the average calculated permeability through the 150 mm thick RCC mat would be 9.0 x $10^{-8}$ cm/sec. This represents the equivalent of approximately 0.8 m of compacted soil having a hydraulic conductivity of 5 x $10^{-7}$ cm/sec, which is more than the minimum 0.5 m of compacted soil having a hydraulic conductivity of 5 x $10^{-7}$ cm/sec indicated by Section 9(6)(c) for solid manure storage or solid manure collection. It is noted that both the hydraulic conductivity of the RCC and interface zone (cracks) indicated above would be considered conservative estimates of hydraulic conductivity* [Exhibit 3, Wood Report, page 43 of 100, emphasis added].

> *The RCC should have a minimum strength of 10-20 MPa. This would result in a hydraulic conductivity similar to conventional concrete (in the range of 1 x $10^{-9}$ cm/sec)* [NRCB Decision Summary LA18053, pg. 11, emphasis added].

The Board finds the average permeability comparisons presented by Mr. Lobbezoo (Wood report, Exhibit 98, pg. 5) compelling:

> *Based on the above, the average permeability, $k_{AVE}$, has been calculated to be 1.5 x $10^{-7}$ cm/s. This would be the equivalent of 0.5 m of material having*

*a permeability of 5 x $10^{-7}$ cm/s (the reference standard for compacted clay liner for solid manure storage provided by the AOPA).*

*With consideration of the solid manure storage mat being frozen for the winter months (i.e., three months per year), the average permeability over the duration of a year would increase by one-third, to 1.13 x $10^{-7}$ cm/s. This would be the equivalent of about 0.58 m of material having a permeability of 5 x $10^{-7}$ cm/s.*

*Finally, a 3.0 m thickness of naturally occurring lacustrine materials having an average permeability of 2 x $10^{-5}$ cm/s would provide an additional equivalent (calculated) protection of 0.075 m of material having a permeability of 5 x $10^{-7}$ cm/s.*

*Based on the above, with consideration of the RCC, up to 15 mm by 10 m of cracking within a 10 m x 10 m unit area, consideration of winter freezing, and consideration of the underlying lacustrine soils, the RCC would provide a total equivalent thickness of approximately 0.65 m of material having a permeability of 5 x $10^{-7}$ cm/s, which exceeds the required thickness of 0.5 m indicated by Section 9(6)(c) of the AOPA.*

*Accordingly, it is Wood's opinion that the Roller Compacted Concrete which has been constructed at the subject Muilwijk farm satisfies the requirements for liner material indicated in Section 9(6)(c) of the AOPA.*

There was significant evidence and testimony at the hearing with respect to the issue of cracking and its impact on the integrity of the RCC liner to meet or continue to meet the requirements of section 9(6)(c) of the Standards Regulation with respect to hydraulic conductivity. The context of this evidence was to assess the ability of the RCC liner to maintain sufficient integrity to ensure groundwater protection. In this regard, the evidence was consistent:

- All concrete is subject to cracking.
- Rebar added to a concrete installation will not eliminate cracking; rebar will likely reduce the width of cracking.
- Cracking does provide a means by which nutrients can pass through the liner into ground water resources.
- Cracking can be identified through visual inspections and can be remediated.

On this basis, the Board accepts that cracking is normal and a certain amount of cracking is anticipated. The Board has reached the conclusion, on the balance of probabilities, that if the RCC liner demonstrates a reasonable amount and width of cracking, that cracking can be addressed through periodic inspections and remediation, and that the permeability characteristics will still be sufficient to meet the requirements of section 9(6)(c) of the Standards Regulation.

### Conclusion and Conditions Regarding Hearing Issue 1

Mr. Muilwijk stated that it was his intention to construct the RCC liner at the Proposed CFO site using installation parameters that were set out in the Previous Approvals, particularly the Stronks application. To that end, the Muilwijks retained the same contractors and attempted to follow the same installation techniques. Based on the foregoing evidence, and the totality of the oral evidence, the Board is satisfied, on a balance of probabilities and giving the benefit of the doubt to Mr. Muilwijk where appropriate, that the RCC liner installed at the Proposed CFO site was constructed in a manner substantially similar to the approved RCC liner that was installed by Stronks.

The Board is satisfied that if the Muilwijks can comply with the conditions set out in this decision, to the satisfaction of Field Services, then the installed RCC liner will meet the hydraulic conductivity requirements of section 9(6)(c) of the Standards Regulation.

### CONDITION 1: Testing of Installed RCC Liner by September 1, 2021

In order to be satisfied that the strength of the installed RCC liner meets the requirements set out, the Muilwijks must provide or obtain test results that establish that the RCC has a minimum compressive strength of 10 MPa. The number and location of cores to be determined by a Professional Engineer and approved by Field Services.

### CONDITION 2: Inspection to be Completed by September 1, 2021 with Respect to Amount of Cracking

The Muilwijks shall have an engineer inspect the RCC liner and file a report with Field Services. The report shall be filed no later than September 1, 2021 and will state:

- The method of inspection as determined by the engineer and approved by Field Services. The inspection plan should contemplate whether random inspection areas can be used and, if so, the number and size of areas to be cleaned and inspected.

- Findings of inspections for cracking. Should cracking exceed one 20 mm wide by 10 m length per 100m$^2$ area, the engineer, in consultation with Field Services, will determine the extent, if any, of remediation that is necessary.

### POST-CONSTRUCTION CONDITION: Ongoing Inspections

The Board requires inspections of the RCC for cracking annually until 2025, after which time Field Services can exercise its discretion as to whether further inspections are required and at what frequency.

## Hearing Issue 2: Whether the potential permit conditions identified in Decision Summary LA19036 for the catch basin and fly control are appropriate.

### Catch Basin–Leak Protection and Monitoring

In his submissions before the Board, Mr. Muilwijk stated that his application for the Proposed CFO included a synthetic liner, rather than a compacted clay liner, for the catch basin. As is the case with many synthetic liner installations in the Board's experience, leak monitoring is often appropriate.

The Board recognizes that there were inconsistent interpretations of the underlying soils, the most reasonable hydraulic conductivity assessment for those soils, and whether the uppermost groundwater resource (UGR) selected was appropriate.

Mr. Cunningham reviewed the Environmental Risk Screening Tools (ERST) for the various facilities and provided his expert assessment of the impact on the risk category of each facility based on a change in the depth of the UGR. While it was clear that the risk categories may have changed in certain cases, the overall assessment by Mr. Cunningham of the catch basin requirements did not change.

The Board did not have sufficient information to make a final determination as to the potential permit conditions that would be appropriate for the catch basin, as the information received was not clear and there was no significant reason to believe one source of information rather than another. Accordingly, the Board directs that Field Services review and assess the findings of the underlying soil texture and permeability and the UGR. The Board recommends engaging the Monitoring Review Team (MRT), which consists of professionals from the NRCB, including staff from the Science & Technology Division, to make this determination.

The Board notes that the Decision Summary in this matter recommends that, in the event that the decision is overturned on review, the following condition apply to the Proposed CFO:

*A condition requiring the channel which directs runoff from the open pens into the catch basin on the east side of the open pens include a liner to protect groundwater.*

The Board requires Field Services, in consultation with the MRT, to determine whether a condition is required to install an AOPA approved liner in the channel which directs runoff from the open pens into the catch basin on the east side of the open pens.

### Fly Control

Mr. Muilwijk outlined his approach to fly control but did not provide evidence that convinces the Board that the Proposed CFO does not require a fly control program. In any event, according to Mr. Muilwijk's description, the fly control program does not appear to the Board to be unduly onerous. Over time, should the Muilwijks obtain sufficient evidence that a fly control program is no longer necessary, they may apply for a permit amendment to remove the condition.

The Board has determined that a fly control program condition is appropriate with respect to the Proposed CFO and directs that the same be included in the approval.

## Hearing Issue 3: A determination of the risk associated with the existing water well in the yard.

There was limited discussion regarding the risk to the existing water well located near the house and original hog barns on the Muilwijks' property. The Board reviewed the evidence related to the water well, including the decision technical document (exhibit #3) and the hearing submissions from the Muilwijks.

None of the evidence provided to the Board indicates that the groundwater resource in water well ID 115735 has been contaminated from the hog barns and associated earthen liquid manure storage constructed in the 1980s. The Board accepts the undisputed evidence that the water well is upslope from the catch basin and that the ERST analyses should include a reduced water well score of "1".

Nonetheless, the Board recognizes that this issue was not well-canvassed during the hearing and that it may not have all the relevant information necessary to make a final determination on the matter. As such, the Board returns this question to Field Services and directs a determination to be made regarding the risk to water well ID115735 as a result of the construction of the covered pen and the uncovered pens. The Board directs the MRT to assist in the determination of whether a variance under AOPA section 17(1) should be granted for water well ID115735.

# SUMMARY OF DECISION

The Board acknowledges that, in reaching its conclusions, some of the information upon which it relied was not available to the approval officer when the final determination to deny the Muilwijks' application was made. The Board reiterates that all of the written submissions that it received were carefully reviewed and considered in its deliberations, regardless of whether specific mention was made in the foregoing summary of deliberations.

## Hearing Issue 1

The Board is prepared to approve the Proposed CFO application if the two conditions set out are met. Those conditions pertain to the testing of the installed RCC liner and the inspection of the installed RCC liner for cracking (with a report to be filed prior to September 1, 2021). The Board has also recommended a post-approval inspection condition in order to monitor cracking and the general condition of the RCC liner.

## Hearing Issue 2

The Board has referred the question of whether leak detection and monitoring are required with respect to the catch basin to Field Services and the Monitoring Review Team for consideration. The result of that determination shall be included as a condition if a condition is warranted in their view.

The Board has determined that the proposed condition with respect to fly control shall be part of the approval.

## Hearing Issue 3

The Board recognizes that this issue was not well canvassed at the hearing and has referred the determination of the risk to the water well and whether a variance ought to be issued with respect to the water well to Field Services and the Monitoring Review Team.

## Approval Officer Recommended Conditions

Decision Summary LA19036 (Exhibit #2) recommends a number of additional conditions should the Board overturn the decision. Subject to Board imposed conditions that govern the direction to Field Services, the Board accepts the remaining recommended conditions as outlined in Decision Summary LA19036.

# BOARD GUIDANCE: ROLLER COMPACTED CONCRETE LINERS

The Board generally exercises caution with respect to commenting upon policy that is developed and exercised within the separate regulatory arm of NRCB's Field Services. However, in this case the Board deems that a number of observations are warranted.

The Board heard testimony that, despite its cost, there are tangible benefits to Roller Compacted Concrete (RCC) as a liner in Alberta feedlot pens. The Board notes that research and work that will help to inform these discussions include reports from Alberta Agriculture and Forestry (Exhibit # 82) and the Technical Advisory Group (Exhibit #81).

The Board has significant knowledge and expertise with Alberta's cattle feeding industry and recognizes the potential benefits of utilizing RCC as a liner for feedlot pens, and agrees that RCC as a liner provides the following benefits:

- Improvements in animal health and welfare and production efficiency
- Improved surface water runoff from pens
- Increased efficiencies in pen cleaning and maintenance
- Maintenance of pen floor integrity compared to natural or compacted clay liners
- Use as an AOPA equivalent liner to protect groundwater

Given the level of interest from industry on the use of RCC liners driven by these potential environmental, production, and animal welfare benefits, the Board encourages the development of a RCC technical guideline. While the Board appreciates that technical guideline development can take time, it urges Agriculture and Forestry, NRCB technical specialists, and industry to expedite work on RCC liners for use at CFOs.

The Board has approved this application with associated conditions largely on the basis of decisions made in the Previous Approvals. The Board would expect that the NRCB work with its partners at Agriculture and Forestry and involve industry to expedite a technical guideline for the use of RCC at CFOs, including as a liner for feedlot pen floors.

The Board recommends that the drafters of an RCC guideline address:

- Sub-surface preparation requirements
- Minimum depth of post-compacted RCC
- Minimum density for the RCC
- Minimum concrete strength in MPa and target moisture content
- Compaction requirements around transition zones
- Use of GPS/laser leveling during install

- Whether professional engineers (or engineering technologists) are required on-site during install
- Commentary as to the allowable amount of cracking (based on surface area)
- Consideration of crack remediation criteria
- Monitoring recommendations

## COMMENTS REGARDING THE CONDUCT OF THE PARTIES

Through the review of this file, the Board has taken note of the conduct of both Mr. Muilwijk and the Field Services office at the NRCB. Neither is completely without fault in this matter.

The Board sympathizes with Mr. Muilwijk with respect to the length of time that the Field Services office took to eventually deny his application. The Board acknowledges Mr. Muilwijk's statements that he was frustrated and that, despite feeling that he understood what he needed to do to obtain an approval when he was dealing with the originating approval officer, it was not entirely clear to him what was required to demonstrate that a permit ought to be issued for his RCC liner once he was dealing with the second approval officer.
The timelines between Mr. Muilwijk's Part 1 and Part 2 applications, and his desired construction start, were tight. Mr. Muilwijk's decision to install the RCC liner without a permit was inappropriate. Unpermitted construction is not acceptable to the Board.

Nonetheless, the Board also notes that Mr. Muilwijk expected that if he complied with the requirements of previous approvals, he could reasonably expect to receive an approval for his Proposed CFO.

The Board notes that Mr. Muilwijk requested that the second approval officer identify any information deficiencies prior to making his decision. He indicated he had all the information necessary to make a decision. The Board acknowledges Mr. Muilwijk's concern that the second approval officer did not revisit information deficiencies with him before proceeding with his decision to deny the application.

Finally, the Board notes that the NRCB Approval Policy provides the parties with an opportunity for a facilitated mediation in an attempt to clarify and resolve disputes regarding information requirements related to processing permit applications. While there are no definitive criteria as to when a facilitated mediation should be invoked, it appears to the Board that this file could have been a candidate.

While the Board has heard a substantial body of testimony with respect to the back and forth between the approval officers and Mr. Muilwijk, the Board has focused its consideration of this

matter on the merits of the Proposed CFO application and the information provided to support or to deny that application.

In making the foregoing comments, the Board hopes that both operators and approval officers take the time to reflect upon the delay and regulatory burden that can ensue when expectations are not clearly and consistently outlined, and when parties act outside the scope of the regulatory process.

DATED at EDMONTON, ALBERTA, this 25th day of May, 2021.
Original signed by:

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|---|---|
| Peter Woloshyn, Chair | Indra L. Maharaj |
| L. Page Stuart | Earl Graham |

Contact the Natural Resources Conservation Board at the following offices. Dial 310.0000 to be connected toll free.

**Edmonton Office**
4th Floor, Sterling Place, 9940 - 106 Street
Edmonton, AB T5K 2N2
T (780) 422.1977

**Calgary Office**
19th Floor, 250 – 5 Street SW
Calgary, AB T2P 0R4
T (403) 297.8269

**Lethbridge Office**
Agriculture Centre, 100, 5401 - 1 Avenue S
Lethbridge, AB T1J 4V6
T (403) 381.5166

**Morinville Office**
Provincial Building, #201, 10008 - 107 Street
Morinville, AB T8R 1L3
T (780) 939.1212

**Red Deer Office**
Provincial Building, #303, 4920 - 51 Street
Red Deer, AB T4N 6K8
T (403) 340.5241

NRCB Response Line: 1.866.383.6722
Email: info@nrcb.ca
Web Address: www.nrcb.ca

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