



MEDIA RELEASE
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Frontenac Community Arena will not reopen for the 2020/21 Season

Godfrey - The Frontenac Community Arena (FCA) Board of Directors and staff have had to make the difficult decision to keep the Arena closed for the 2020/ 21 season. This decision was made as a result of the recent discovery that a major component in the refrigeration system was being deemed unfit to operate by the Arena's refrigeration contractors.

"During the off season, we have been undertaking a significant capital equipment replacement projects part of the FCA Asset Management Plan. This included replacement of the ammonia chiller, condenser and the brine pump. As part of the process the old brine, or 'secondary refrigerant', needed to be flushed out of the system. Unfortunately, during this process significant degradation and debris in the headers and the in-floor circulation pipes was discovered." said Tim Laprade, Arena Manager. "Starting up the refrigeration plant with that much debris in the system could have a disastrous impact on the new chiller and circulation pump while potentially resulting in health risks to staff, players and patrons," added Laprade.

"The FCA acts as a community hub where people come together to engage in healthy activities. Under these unexpected circumstances, the Arena board and staff have considered every option for reopening the arena. Although it was difficult for us to have had to make the decision to close for the season, it was unavoidable and will give the FCA the much needed time to complete additional capital improvements that were scheduled for March of 2021," said Ray Leonard, Township of South Frontenac Councillor and Arena Board Chair.

The Arena will take advantage of this extended shutdown period by starting the scheduled 2021 capital improvement project earlier than expected. This will include replacement of the headers, flooring, rink boards, glass, players/visitors benches, timekeeper's box and installation of integrated rubber matting around the entire pad.

"The FCA Staff and Arena Board understand the challenges that this closure will pose to our user groups and are in contact with organizers regarding the closure." said Tim Laprade, Arena Manager. "We look forward to welcoming everyone back in September of 2021 after all of the improvements scheduled during this extended shutdown are complete," added Laprade.

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BACKGROUND

In 1976, with the support of several Townships in Frontenac County, the North Frontenac Community Arena opened in Godfrey. The Arena (now Frontenac Community Arena) is an independent not for profit corporation governed by a board of directors and funded in part by the Townships of South and Central Frontenac.

Over the years, the Arena has provided a place for young and old alike to gather and engage in sporting and recreational activities.

Question & Answer

Q: What is the issue in a nutshell?

A: The Brine headers and lines/circuits contain a great deal of debris due to degradation of the steel pipe. Introducing glycol (secondary refrigerant) to the system would cause failure of the new ammonia plate and frame chiller system along with circulation pump and pose potential risks to staff, players and patrons.

Q: What is the function of the headers and brine/glycol lines?

A: The brine/glycol secondary refrigerant is supplied to the floor via 6" headers. The headers are constructed of steel. The headers feed an in-floor-cooling grid consisting of 16 kilometers of 1" polyethylene pipe spaced on 3" to 4" centers. Brine or glycol secondary refrigerant is supplied by the headers into the circuits/ lines under the pad/ floor to remove heat as part of the refrigeration process to make artificial skating ice.

Q: What type of header system does the FCA have?

A: The current brine header systems is contained in open air trenches at the end of the rink. Although open air trenches provide easier access for repair and maintenance during the ice season, they are more susceptible to corrosion and degradation over time. It also creates an additional slip hazard for staff and patrons as when the headers move brine during the operating season they produce a large amount of surface ice which freezes the top floor boards.

Q: What is the age of the headers and brine lines in the floor?

A: The headers were replaced in late 1990's and the brine solution and actual brine lines/ floor are original constructed in 1976.



Q: Why did these headers degrade and how long do they normally last?

A: If properly maintained headers can last between 20-25 years depending on the condition of brine. Just like salt on your car in the winter, the brine solution breaks down the metal over time. As the brine solution breaks down it leaves a calcium type residue inside the piping and headers which reduce the overall heat transfer of the ice slab and can cause the refrigeration system run longer during peak energy times to produce the desired cooling effect for quality ice. The build-up of calcium deposits will over time reduce the interior diameter of the pipe, which reduces flow and heat transfer.

Q: How was this issue determined and why didn't we know about this earlier?

A: As part of the 2020 capital replacement project, the arena brine headers and floor pipes had to be flushed of the old brine in order for the new secondary refrigerant (glycol) to be added. It was anticipated that there would be some degree of degradation. The extent of degradation was not discovered until after numerous attempts to flush the system using powerful chemical cleaners and cutting open the headers and circuits for an in depth investigation. There is no way to determine how bad this could be as most of the piping is enclosed in 5" of concrete.

Q: Were there any signs of this being an issue over the past few seasons?

A: The old chiller and brine pump had been experiencing some service disruptions that was attributed to the age and condition of the equipment. The reason the blockage and debris has not shut the Arena down previously is that the brine was bypassing the blockage in the lines and the current equipment was still functioning while experiencing some failures along with reduced efficiency. The chiller, brine header and rink floor piping is a closed loop heat transfer system. It is not ideal to open this up at any time as air can then be introduced in the system which can damage the system prematurely.

Q. Is the debris isolated to just the headers, or is it elsewhere?

A: Debris found in all supply (2) and return (2) headers along with the secondary refrigerant/ brine lines/circuits that run through the arena pad/ floor.

Q. Why can't the new primary refrigerant (brine/glycol) be introduced into the system?

A: Introducing a secondary refrigerant with known contamination/debris in the headers and floors has the high likelihood of causing the new replaced plate/ frame ammonia chiller to plug up and fail. The Refrigeration Contractor has informed the Arena that they will not introduce glycol into the system under the current condition. If glycol is introduced at this point, it will mix with the contaminated brine residue and potentially form a solid like sludge and damage major equipment.



Q: When are the headers and lines/circuits scheduled to be replaced?

A: Current brine headers are over 20 years old and the lines/circuits are the original from 1976. Replacement of these components were already budgeted and planned to occur as part of the overall floor replacement capital project scheduled for the annual shutdown commencing early March of 2021.

Q: Why can't the headers be replaced now?

A: The headers will be replaced at the same time that the entire arena floor will be replaced. The headers will be replaced with a new style of blue line header system that is less susceptible to corrosion, requires less maintenance and is much more efficient. It is actually buried beneath the floor along the blue line. Hence the name 'blue line' system. If we were to replace them now, we would incur great costs for a system that we intend to replace in less than a year (2021). Given that the debris is also within the lines/circuits, replacing the headers only will not completely resolve the issue.

Q: Why wasn't the 2020 capital equipment replacement project combined with what is scheduled in 2021 (headers and floors) and completed all at once this off season?

A: The capital equipment replacement that took place during this 2020 offseason were critical pieces of equipment that were experiencing major breakdowns and servicing issues. In particular, the old ammonia tube style chiller would not have been approved to be put back into operation by the pressure vessel regulatory agencies.

Combining of both projects would have been at a great cost to the Arena and its funders, Central Frontenac and South Frontenac Townships for the 2020 budget cycle. Combining both of these projects could have also meant the work would not have been completed in time for a 2020 start up.

Lastly, the Arena is awaiting confirmation from the provincial and federal governments on 'if' we were successful in the Investing in Canada Infrastructure Program (ICIP) grant application that could cover up to 73.33% of the \$1,000,000 in 2021 project costs. Any work completed prior to government approval would not qualify for the potential grant.



Q. What options were considered to fix this issue so that the FCA could open for the 2020/21 season?

A: Given the extent and severity of the issue, the Refrigeration Contractor would not recommend to introduce Glycol refrigerant into the existing cooling system.

The only potential option would be to replace the headers with the same style of old, open trench system and attempt to further flush out the lines/circuits. This would be at a cost of up to \$100,000 and would push a potential 2020 start date until the end of October. Even if this approach were taken, there is no guarantee that additional blockages don't also exist in the arena floor, and the work would also impact the scope of the 2021 replacement project.

Q. What are the refrigeration experts suggesting?

A: The refrigeration experts would have to continue to attempt cut open and flush lines with chemical so that they could clean out the debris at a significant cost to the Arena. From their experience with other similar projects, they feel that the extent of the degradation is beyond what can be remedied without complete replacement of the headers and brine lines. They also want to ensure the new plate chiller and cold floor pump are protected and not prematurely damaged as a result of introducing the new glycol charge. This would most certainly impact manufacture warranties which would not be in the best interest for the Arena. There are always uncertainties with these types of complex projects that involve older equipment.

Q. What could have been done to prevent this issue from occurring?

A: The header and brine lines along with the floor were budgeted for and scheduled for replacement commencing March of 2021. Over the past few years, as part of a service agreement with the refrigeration contractors the brine was tested annually and pH levels adjusted along with corrosion inhibitors being added. Due to the nature of this blockage/sediment problem, it was not detectable during these annual tests.

Q. Are there any other key components or equipment at the FCA that is at risk of failure?

A: For the past several years, the Arena has been taking a proactive approach to equipment replacement and maintenance as part of the asset management plan. The priority has been on replacing refrigeration equipment that was causing service disruptions due to breakdowns or had the risk of causing injury or death in the event of complete failure. Other capital work completed focused on reducing consumption of electricity while some items were to increase comfort for arena patrons.

Capital work completed included; replacing the ammonia gas detection and warning system, Refrigeration plant control panel, two compressors and motors, emergency exit upgrades, overhead sound system, spectator heating in the stands, overhead pad lighting converted to, dehumidification system, building downspouts/eaves, all tube lighting throughout the arena converted to LED, propane furnace, three hot water tanks, replacement of the ice



resurfacers/Zamboni, ice edging machine, evaporative condenser, cold floor refrigerant pump and ammonia chiller system.

Q. What is the impact of this closure to the leagues and communities that use the FCA?

A: Unfortunately, groups that planned to return to the FCA won't be able to do so until the 2021 season start up. Our season was already impacted by COVID-19 along with the requirement to shut down earlier than usual in March to begin the 2021 capital floor replacement project.

Q. What is the financial impact of closing the Arena for the 2020/ 21 season?

A: Given that this season was already impacted by the restrictions put into place as a result of COVID-19 the Arena may see a substantial costs savings. Measures and response to COVID-19 would have increased the Arenas operating costs substantially while also reducing revenues from canteen sales, gate revenue and ice bookings.

Q. Is there any positive news out of this unforeseen service disruption?

A: Given that the Arena will be shut down for the season, we will be in a position to start the 2021 capital projects earlier than the planned March 2021 shutdown. This will give the Arena more time to plan the project and will provide a large buffer of time between the start of the project and Arena start-up in September of 2021. There will be many more unknowns during the floor revitalization project. Contractors will be removing concrete and exposing 44 year old sub soil. There is a risk of soil contamination which if found would add weeks to the new project. Allowing ample time to complete this project is the best case solution. This will also allow the Arena to secure the proper industry leading Engineering/Consultants, General Contractors and Refrigeration Contractors to ensure the best product is sourced and installed. This substantial financial investment will ensure that the Arena maintains a safe and efficient operation for years to come.