

JOHNSON INCIDENT COMMAND MEETING NOTES  
JOHNSON MUNICIPAL BUILDING  
MONDAY, FEBRUARY 12, 2018

**Present:**

In person: Eric Osgood, Doug Molde, Gordon Smith, Meredith Birkett, Brian Story, Rosemary Audibert

By phone: Ben Rose, Craig Myotte (Morrisville Water & Light), Kevin Newton (Morrisville Water & Light), John Tilton (Morrisville Water & Light), Steve Daly (Cold Regions Research and Engineering Lab), Joe Rocks (Cold Regions Research and Engineering Lab), Jaron Borg (Agency of Natural Resources)

The meeting started at about 2:00.

Eric recapped the situation. We have an ice jam about a mile long from a falls upriver from the village to a falls downriver from the village. There is a pretty good fortified jam right at the mouth to the lower falls, in an area where the river narrows. The narrowing is thought to be due to blasting of ledge after the 1927 flood. Another major fortification is closer to the center of the village. It affects the area where the Gihon comes into the Lamoille. The Gihon has an ice jam extending probably a quarter to a half a mile. Water in that area is currently over the banks and flooding into abutting wetlands. It is not causing any issues now but it would not take a lot more water before it would cause issues. We have had a drone go over the river and do a video. The ice jam hasn't changed or moved a huge amount. We have seen a little flooding but the water finds its way back into the Lamoille.

We have explored some different ideas. One idea everyone brings up is blasting. Everyone we talked to has discarded that idea as being very dangerous. Some blasting would have to be done right in the village, causing issues with hitting homes or people.

Discharge of slightly warmer water from the wastewater plant is something Montpelier has done with some success. Our capacity is not that large and we think it would not have any real impact. We have no way of routing the water to certain areas like Montpelier can.

Steve Daley asked if we see a melting or opening of the where the discharge goes out from the plant. Eric said no, we haven't seen any difference there.

Eric said another suggestion was applying dark material to the ice. Montpelier found that had little effect. Access to the river to put the material on is problematic for us. Steve Daley said Montpelier used leaves and spread them with a hydroseeder. We wouldn't need to get right up to the bank. Eric said that may be worth checking into. One of the major jams, the one at the lower falls, is quite a distance from any access point and down a cliff.

Eric said probably the best option we have been able to come up with is an excavator. We have some issues with access to the river and there is some risk. G.W. Tatro is looking into it. They are going to get back to us with a plan and their thoughts.

Another option is release of water from Green River Reservoir. That is the main reason for this call.

We also looked into something they use in Texas – aqua berm, a bladder that can be rolled out like fire hose and filled with water until it is about 6 feet high. It is like a big tube of water that can be used to divert water. It would not be practical for us. Any place we divert water from causes a reaction in another area. We would have to protect the whole village with these aqua berms.

G.W. Tatro is going to provide a plan and cost estimate. The thought is that they probably would go into the fortified jam area in the center of the village and maybe dig a channel for water to start coming through. Maybe then ice would start falling into it. There isn't a lot of ability to throw the ice over the bank somewhere. It is probably not practical to truck it out.

Green River Reservoir is owned by another town. They have expressed willingness to talk to us about it. They have some latitude on how much they can release without further permissions. The question is whether the benefit of releasing water from the reservoir is worth the risk and cost. We need to know the cost.

Steve Daley said the idea behind releasing water from the reservoir is that even though the reservoir is probably ice covered there is probably a reserve of warmer water near the bottom because water is most dense at 39 degrees. At the surface it is 32 degrees and it can be warmer below. There is no guarantee there will be 39 degree water below. It depends on how much wind mixing there was before the ice formed. If there is 39 degree water, it can be used to melt ice. A real disadvantage is that the Green River Reservoir is quite a ways upstream.

There was discussion about the distance between the reservoir and Johnson. Craig Myotte said it is about 14 to 16 miles.

Steve asked, there must be ice cover on the Lamoille and on the tributary coming from the reservoir? Craig said yes. Steve said when flow is released from the reservoir we want to release from the bottom where there is the warmest water. It will start melting the first ice it comes in contact with. When it melts that ice, it cools the water. It will melt all the ice from Morrisville to Johnson and then whatever warm water is left can start attacking the ice in Johnson. That means it is going to take a while for the warm water to get to Johnson and it will have to melt all the ice between the reservoir and Johnson to be effective.

One of the MW&L representatives said the temperature of water coming out of the tailrace at Green River Reservoir was 36 when they checked it.

Steve said that's 4 degrees above 32. If we knew how much ice there was and how much was released we could probably calculate how long it would take to get down to Johnson. It might take a day or more until all the ice was melted out down to Johnson.

Craig said they do have some constraints on the drawdown side of things. They usually make sure they can fill the reservoir back up with spring runoff. Probably they can go down about 5

feet, which would probably be about 5 days of full operation running the 2 hydro units they have available.

Steve said the question is whether there is enough energy that can be released in that 5 feet of drawdown to reach Johnson and melt out significant ice cover. That is unclear to him at this time.

Craig asked if anyone has any computer models or similar resources that could help with calculations. Probably the amount released from the reservoir would be about equal to what is already in the Lamoille. Jaron said Seth Jensen from LCPC told him on Friday that they have detailed hydraulic modeling for much of the Lamoille. He can find out what they have. Steve said he thought that would be good. He said we can also do “back of the envelope” type calculations. We would need to know the ice thickness and the river slope.

Eric said he is not sure if looking at the drone video would help or not. Steve said it would be great to have video from Johnson all the way to the reservoir.

Eric said when we had the flood event the part of the river he could see from Johnson to Morrisville had open water. He is guessing most of that is newly formed horizontal ice that would go out fairly quickly. There was also a lot of open water below the lower falls.

Steve said if the river were open right now then the reservoir water wouldn't lose that much heat before it arrived in Johnson.

Eric said if the flow of the Lamoille is about the same as what could be released and we are at 36 degrees in the reservoir . . . Steve said that would really dilute the water coming out of the reservoir.

Eric asked if just putting that volume of water down the river would help weaken the ice and accelerate the process of melting the jam. Steve said when it comes to melting the ice, we can calculate the heat transfer, but he doesn't have a good feel for how lifting the ice would work. That would be a total experiment. It is not clear what the results would be. He doesn't think anyone could predict exactly what would happen. Eric said he doesn't want to do any harm. Steve said putting more water through a plugged channel could really increase flooding. If the water is running at 32 degrees it may not weaken the ice that much when it gets there.

Eric said someone had suggested that we would want to do a release on a warm day with no weather events predicted in the next five days.

Steve said on a day with bright sun if there is open water the sun's heat will be readily absorbed and heat the water. If there is ice cover and there is snow on the ice, that reflects light away so it won't do that much. If there is open water upstream all these warm days with sunlight are helping.

Ben said Scott Whittier said it makes sense to do a release when it is warmer but we also want to make sure there is not a lot of precipitation or fast melting forecast because then there would be more water coming in and if we fail to dislodge the ice jam the risk would be increased.

Steve said he would say the excavator work can be done any time and we don't have to worry about coordinating with a release. The more ice we could pull out of the channel the better, especially if we can do it in the village where the worst flooding was.

Eric said ideally we would like to start excavating when there is open water below so the ice would start flowing out and leaving. Steve said if the ice was just piled along the banks he thinks that would be good as well. Ben said piling the ice along the banks would be difficult but not impossible for much of that reach.

Steve said putting dark material on the ice will help it absorb sunlight and help with deteriorating the ice when the sun is shining but it will be covered whenever it snows. If we could put more on each time it snows he thinks that would be good. In the old days people would use coal dust, but we could use sand or river sediment.

Eric asked if we have access to a hydroseeder. Brian said yes. Eric asked if using a hydroseeder would be a good idea. Steve said he thinks so. That is what they use in Montpelier.

Eric asked if Steve thinks there is value in getting test holes in areas where the ice is fortified the most.

Steve said if the ice is really jumbled up and uneven it's usually not very safe to have people go out on it. That is the problem with that, but drilling holes has been used in other locations. It is most effective to go out on the ice before it's broken up and drill dozens of holes a foot or two in diameter. That weakens the ice and allows sun to contact the water. Once you have an ice jam it is usually not safe to go out on the ice jam.

Eric asked if MW&L has any ballpark cost figure.

Craig said MW&L uses Green River Reservoir to generate hydropower when market prices are high and to shave peak demand. Those 2 things combined are probably in the neighborhood of \$200K per year. Spread evenly over 12 months that is about \$15K a month. In this case if they draw down they will lose capability for February, March and part of April, so there would be 2-3 months of losses. The power generated would have some value.

Eric asked if it is it safe to say the cost would be around \$50K. Craig said it would be in that ballpark.

Steve said he doesn't think we would want to do it until we do calculations to determine if warmer water will reach Johnson.

Eric said we will want to do a cost benefit analysis. We won't want to spend the money if the benefit is not going to be there.

Ben said the Gihon ices up like this pretty often, doesn't it? He asked how often we have seen ice jams like this. Eric said this is the first time we have seen an event like this. Gordy Smith was fire chief for a long time and he said back in the 80's they had a fairly good ice jam that affected the downstream end of the village but no one in town recalls ever having an ice jam of this magnitude.

Ben said he and Eric had discussed setting up a standing call and checking in every week as conditions change and as information on the options comes in. We could also get a long range weather forecast briefing from the National Weather Service. Would that be helpful? Eric said he doesn't think it hurts. This is the time to plan, before the weather changes.

Eric said we here in Johnson have to weigh the benefit against risk and cost. He thinks we will go ahead with the excavator if we get a reasonable proposal. How that goes may determine what we do with a release request.

Steve suggested that someone should look at the river between Johnson and the reservoir and calculate how much is ice covered. We have to be conscious of safety but any idea of ice thickness would be good too.

Craig said one of MW&L's hydro units is out right now with a relay issue. They think they will have it back in a week or two. But until then they could only run one unit. That means 140 cfs rather than 280.

Eric said he thinks he is hearing that the amount of water released would not negatively affect Morrisville. If we decided to go ahead with a release we would have to pull Cambridge in so they could prepare. The ice and water moving down could cause problems.

Steve said the ice usually melts in place. You don't see that much downstream movement. Eric said it is quite a distance between Johnson and Cambridge and there are a lot of meadows where the water could get out over the banks before it ever gets to Cambridge. So probably there would be very low risk for Cambridge. Steve agreed.

Ben suggested that the next meeting be scheduled for the Monday after next. Eric said he thinks we can wait until then because the extended forecast shows it will not be warming up much.

Eric asked if anyone had any other thoughts or suggestions.

Jaron asked what information we could get to Steve to help him do some modeling for 2 weeks from now. Steve said a map of ice cover upstream to the reservoir would be good. Jaron said he will get together with LCPC and see what river mapping data they have available and figure out a way to get it to CRREL.

Ben said he will schedule a meeting for the same time two weeks from today.

Those participating by phone left at about 2:45.

Brian said they were a lot more optimistic about putting dark material on the surface of the river than others we have spoken to.

Eric asked who owns the hydroseeder. Brian said we do. He said he would want to run it by Chris Brunelle before spraying sand onto the river.

Doug said he thinks there are areas where it would be safe to check the thickness of the ice.

Doug said he knows nothing about this but he thinks we might want to try removing ice from the Gihon near where it flows into the Lamoille to see what effect that would have on the situation. Eric said the drone video shows there is a major jam behind the United Church where the Gihon takes a 90 degree turn. That is probably what is causing the flooding into the meadow behind the United Church and in the woods on the other side of the river.

Doug said trout fishermen believe summer releases from the Green River Reservoir affect the water temperature in the river for 5 miles. There was discussion about how much ice there is on the Lamoille between Johnson and Morrisville. Gordy said he is afraid water released from the reservoir will lose its cooling effect when it hits the area near Cady's Falls. Doug said he doesn't think much of the heat will get here. Eric said it would cost a lot of money. Gordy said if we do it this year people in the village will want us to do it again in the future.

Doug said he feels we should have Tatro do excavator work. People will want to see us do something. Eric said probably an excavator will be most cost effective. Meredith said it is really unknown what the impact of a Green River Reservoir release will be. Doug said work with an excavator may give us helpful information.

Eric and Brian said people they had talked to previously had suggested waiting longer to start work with an excavator, especially if we don't want to haul ice away in a truck. Doug asked, don't we want to get the ice on land? Eric said there is concern about where to put it. If we pile it to the sides then if the water comes up it could pull it right back in. Brian said previous advice was to start excavator work once the ice starts to break up. Doug said he thinks a reason to do some earlier is to get some information about how it works. He would be in favor of waiting if we have a lot of experience, but we don't.

Doug said Tatro must have some experience pulling ice out of jams. Eric said yes, they worked on that in Hardwick. Brian said they were working in Swanton recently. Doug heard they had worked in Barton and Colchester.

Eric said they are going to give us a proposal. Gordy said Greg Tatro is a Johnson taxpayer and has a vested interest in looking out for the town.

Gordy said Corey Davis has a drone with an FCC license that allows him to do line of sight for 3 miles. Doug thinks we should fly the river to the reservoir with a drone. Brian said he was going to talk to Corey about that. Gordy said he thinks we only need it to go from here to Cady's Falls. Doug said he thinks we could eyeball a lot of the river after Morrisville.

Eric said he and Gordy are planning to pull department heads and agency representatives together to put together plans for a flood event like the 1927 flood.

Doug said he thinks we ought to tell people in flood prone areas that they should consider having aqua berm on hand. Eric said it wouldn't be feasible for us to use it to protect the whole village. Doug said for some individuals who could experience big losses it might be worth looking into.

The meeting ended at about 3:06.

*Notes submitted by Donna Griffiths*