

## **Goffs Quarry Community Liaison Committee – Meeting #4 Minutes**

Tuesday, December 12, 2017 6:30–8:30 PM

### **Members in attendance**

Bill Horne, MLA  
Martin Zwicker, Resident  
Anna McCarron, SWEPS  
Mimi LeCain, Resident  
Bud Baker, Resident  
Greg Hughes, Clean Earth  
Sean MacLean, Maritimes Northeast Pipeline  
Kerri Irwin, Resident

Cameron Wainwright, FRABA

Mark Webb, Scotian Materials  
Rob MacPherson, Scotian Materials

### **Members absent**

Angela Dicker, Resident  
Dean Bouchard, Airport  
Jason Crowell, FRABA  
Steve Streach, Local Councillor

### **Others in attendance**

Dan Corkery, Golder Associates  
Casey Spears, NATIONAL Public Relations

### **Call to order**

Members go around the table introducing themselves.

Dan Corkery of Golder Associates introduces himself to the committee and reviews his credentials of blasting experience and impact assessments.

### **Proceedings**

Dan's presentation reviews the quarry approval requirements for blasting, regulatory requirements, overview of how the blasting is done and the impacts of blasting such as ground vibration, air concussion and fly rock and the results of the first blast at Goffs Quarry. He explains Scotian Materials has gone above and beyond by asking to have a third party, being Golder Associates, review the design, the "Safe Operating Procedures for Drilling Loading and Blasting" and results of the ground and air vibrations associated with this blast. Scotian Materials asked for this as part of their quality control and to ensure nothing was missed and it's a safe operation.

Dan explains the drills drilled 3.5 inch diameter holes (9 feet between rows and 9 feet between holes in a row.) and then the blast holes are loaded with explosives. Two quality control procedures ensure explosives aren't overloaded. That is, the explosive column is measured with a tape and the explosive loading truck has an automated measurement of the weight loaded for each hole. He explains when a

blast happens humans may feel two things: 1) Air concussion (a pulse of air) from the blast face, from the movement of fragmented rock and gases escaping from the newly created fractures and 2) Ground vibrations transferred the remaining rock mass (primarily behind the blast).

Blasting limits set in Scotian's industrial permit are air concussion (128 dBL) and ground vibrations (12.5 mm/s), which must be measured at the nearest offsite structure to the blast. Goffs was done in five places for additional readings above and beyond what is required. Dan shows the map during the presentation. The design of blasts as well as the drilling and blasting is carried out by Dyno Nobel. The monitoring is conducted by an independent third party consultant, K&M Inspection Consultants. These locations are various distances from the site (e.g. 2 km, 1,600 m, 210 m). Specialized equipment is used to monitor ground vibrations and air blasts, but also to measure the duration of the blast itself. This is calibrated annually to international standards.

Dan shows an image of the equipment used to monitor the blast and a graph summary is shown with the air concussion and ground vibrations. The data file is locked in so no one can alter the information after the fact.

A question had been brought up in the past: Will the blasts impact the permeability of water within the rock? There are no fractures extending past the quarry property and studies have shown it's likely no new fractures will be shown within 6 m of the blast site. Blasts don't impact permeability beyond approximately 10 m from the blast (it's very localized). Dan shows a graph of the vibration attenuation for reference as well as the regulated limit used to design the original blast at Goffs. Each site is specific and has a different graph. The graphs will change as more data is added from future blasts happen (i.e. the curves will change).

128 dBL is the permitted limit in the industrial approval for air concussion. Dan explains one would feel a 1 mm/s blast vibration on their feet and if someone is 300 feet away, they would also hear it. It's typical that people see a blast before they actually feel it. At 117 dBL, dishes rattle and 128 dBL is the Nova Scotia limit for Goffs. However, wind can cause higher overpressure than blasts if the blasts are within the approval limits.

Kerri asks: Do you take into account the wind and weather conditions? Dan and Rob both explain it is hard to separate the two (wind vs. blast overpressure). The blast is two seconds and the units are set up to record a five seconds interval. There typically a lull between the ground vibration and the arrival of overpressure. Sometimes the blast overpressure occurs with the wind and the two are recorded. Sometime, the wind component cannot be separated from the blast overpressure. If windy conditions are anticipated, the blast isn't adjusted.

Dan explains when discussing people's responses to air pressure and ground vibrations, it's a number of factors because everyone feels the blast slightly differently. A few factors are: Do you know the blast is coming/are you expecting it? For example, is it happening at 2 in the morning rather than a regular time? Are you prepared for it? Humans are very sensitive to vibrations but aren't very good at estimating the level vibrations. People perceive blast vibrations inside a house as higher than those felt outside a house. Windows would be the most susceptible to the air concussion and drywall seams would be the most sensitive for ground vibrations.

Dan reiterates that operators never want impacts to cause problems for their projects. Scotian Materials has created measures to mitigate problems. All the blasts are designed to keep them compliant with approval limits, but also all the health and safety operations too. They are designed to keep vibrations low and fly rock within the site. Scotian Materials has gone above and beyond by having third party consultants monitoring with ground vibrations and have the third party review the blast design and blasting contractors protocol (design, procedures, health and safety, and contractors have to all be on board and know they are responsible for keeping the project within the permits and keep neighbours up-to-date).

Shawn asks who K&M Inspection Consultant are and Dan tells the group K&M supply and install the vibration monitoring equipment.

Martin asks for Dan to explain the rationale that the Department went through to select the 128 dBL measurement. How is that selected? Dan explains it's based on research throughout the years of Canada, the US and over the globe. There was a house near an ongoing blast site, which was monitored as the blasting approached the structure. They were able to measure the onset of fractures and cracks and relate those to the specifics of the blasts. There has been additional research to verify these findings (e.g. the levels that create fractures). There has been a lot of research published on concussion and the damage to buildings and windows. These studies show us the impact on windows. The government has compiled different sources of information on the impact of blasts. The approval limits of 128 dBL and 12.5 mm/s are the same as the limits for quarries in Ontario and a few other provinces. There is a strong sharing of the data. The Society of Explosive Engineers has conferences every year to discuss blasting and explosives; including way to make blasting safer and better ways to approach blasting.

Mimi says the geography between Ontario and Nova Scotia are complete different. She asks how would the blast affect the water table and wetlands? Dan explains that wetlands in Ontario are very similar to Nova Scotia. Rob says Sean and Phyllis addressed this at a previous meeting, but Mimi says Phyllis wasn't able to comment on this. She says some wetlands are within the quarry site. Rob says the wetlands are around the quarry boundaries, not in the quarry itself. Mimi asks for confirmation if the wetlands will be affected and Dan says he isn't a wetlands expert and therefore cannot comment. Rob clarifies that Sean discussed the cone of influence (when you take rock out of the quarry, there will be a cone where groundwater goes down).

Bill asks how much rock is blasted using 128 (how many tons)? Dan says the way blasting is designed, each hole is given a delay. All these holes are separated by 17–25 ms, they all go off and impact the houses separately. Typically, if you're going to design a blast with each holes detonating separately (one hole per delay), the house "feels" each pulse separately. It has less to do with the volume, but more about how much explosive is going off per hole. Houses "feel" separate impulses for each delay period. Scotian Materials sends Dan the blast design. Based on the design, he does his own calculations to verify what the estimates with the design is accurate and should result in a compliant blast.

Dan then proceeds to review the actual first blast results. There wasn't any rock fly beyond the site and four out of five monitors were well below the 12.5 mm/s. At the nearest residential subdivision / community, the ground vibration was ~8% of the limit and concussion was ~10% of the limit. At this distance, the differences between different residences (within the subdivision) would be miniscule.

Bill asks if there was much dust during the blast. Rob says there wasn't any dust. They found with this blast that there was a westerly wind (towards Aerotech), which was a good condition. Rob will look to schedule other blasts with a similar wind and day like this. This will lessen the potential impact on the residential areas. Clean Earth, the closest business to the quarry, notified their staff that the blast was going to happen and their gear wasn't going at this time. They didn't hear or feel anything.

Dan says the recorded vibrations at the pipeline set up was 17mm/s, as opposed to the 12.5mm/s limit in the permit. This resulted in an exceedance report being issued to the NSE which outlined the cause of the exceedance reading and the quality control steps being implemented to prevent a reoccurrence. This reading was due to poor set up and the environment in the area, not the instrumentation. The monitoring equipment should have been set up on bedrock or below the surface, which didn't happen. The monitoring set up will be added to the quality control program to ensure future set up are checked. This should be the worst of the vibrations in the foreseeable future. The sinking cut is typically the worst for vibrations, concussion and flyrock because it has no place for the fragmented rock to go except up. This often results in higher vibrations in the ground.

Dan finishes his presentation and Bud suggests everyone take a turn going around the table and asking any questions they may have.

Martin: How many 9x9 blast holes are there? Is it modelled in software for the blasts before it's done? Rob says it's modelled by a technical team that is shared with Dan and that there were approximately 90 holes. Dan then confirms with what they are saying. There would be one hole in the 9x9 square. The modelling showed the predicted vibration at the pipeline was 7.8 mm/s. These are based on standard models, but as you go along with every blast, you refine the models so they are better each time. They aren't completed and then ignored. The results are incorporated into the model to make it more site-specific.

Martin asks how do the exceedance get recorded. It's explained that an hour after the blast, they get the blast results sent to them and if there's an exceedance on it, they send it to NSE. Maritime and Northeast Pipeline also receive the results from Scotian Materials.

Anna: Does Maritime Northeast have its own vibration monitoring equipment? It's explained this would be third party, they don't have equipment for monitoring the blast. The integrity program always has something in place (monitoring on CP systems, run the numbers, technical specialists, and smart tools above industry standards). They don't have concerns about the blast. Their team looked at the numbers and there isn't a lot of concerns as the permit limits are conservative compared to their tolerances for blasting near pipelines. The excavators are more of a concern. Shawn says he has an invested interest in keeping the pipeline safe and free of damage.

Kerri: Will the results of the blast be published? Rob says they go into the annual report. Kerri says she's thinking of the other 75 residents and if they're concerned, they could go online. Rob explains they won't be published; only in the full context of the report. Kerri says if the residents have concerns and then they say the numbers of the first blast, they might be less concerned of the project, especially if they feel their house rattle and then saw the nearest residential was considerably less, they may feel safer than having to wait a year for the report. Rob says they could look into providing results for the residents, but would need to have a report to explain the results as the raw numbers would not provide much context for people.

Rob says the results will be presented in February. Anna asks if the copies will be provided to the CLC. Rob says hard copies won't be provided because they're roughly 400 pages long. Rob will put them on the secure link that the CLC members have been provided.

Rob says he wants to clarify that he's in a situation where he's trying to be as open as he can be, but at the same time, there's still groups/individuals that are appealing and taking Scotian Materials through legal processes. He hopes the CLC appreciates he's being as open as he can be at this point. He says when February comes, they'll evaluate where they're at with the legal processes.

Bill: Did anyone hear the blast or know anyone who did? Kerri says she wasn't home, she was at work, but some of her neighbours did feel it. Rob says he didn't receive any complains through the complaint process. He explains they are done blasting for this year due to the weather. Moisture in the material makes it unworkable. He'll blast in January or February if there isn't a lot of snow. Otherwise, it'll be before they proceed. The CLC will be notified in advance of any blast by email. He says the procedures and protocol went really well for the first blast.

Anna says there's been a lot of blasting in Lower Sackville near her workplace.

Rob reiterates that everything went well with the blasting. Rob says they are taking a lot of effort to ensure the blasting doesn't have negative impacts on the neighbours, they don't want to upset people. Dan says Rob is doing things not only to be compliant, but to be considerate too. He says this is a really good approach and there are certain quarries in Ontario that wouldn't even think of doing the extra that Scotian Materials is doing. Bud says when he used to live on Lake View Road, there was no mistaking the blasts, and he would lose his balance.

### **Next Meeting**

It's decided the next meeting will be held Tuesday, March 20 at 6:30 PM. It's determined the CLC will now meet quarterly (March, June, September, and December).

Mimi requests the March meeting have a specialist come in to discuss regulations that are in place in case the wetlands are affected from the project that would impact their ability to provide habitat for animals. Rob agreed to see if he could source someone from NSE to attend and discuss.