

**CONFIDENTIAL MINUTES**  
**COLLIERY DAMS TECHNICAL COMMITTEE**  
**TUESDAY, 2014-JAN-22 AT 9:00 A.M.**  
**ROOM 1, BEBAN PARK COMPLEX, 2300 BOWEN ROAD**

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**PRESENT:**

*Snuneymuxw First Nation:*  
Paul Silvey (10:55 a.m.)

*Golder Associates:*  
Herb Hawson, Director of Special Projects  
Bruce Downing, Principal  
Dr. Bill Roberds, Principal, Decision & Risk Analysis

*City of Nanaimo:*  
Toby Seward, Director, Social & Protective Services (9:28 a.m.)  
Dale Lindsay, Director of Development Services (9:33 a.m.)  
Holly Pirozzini, Recording Secretary

*Colliery Dam Park Preservation Society:*  
Jeff Solomon  
Geraldine Collins  
Bill Heathcote  
Lorne Gale  
Leon Cake

Katherine Gordon, Facilitator

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1. Call to Order

The meeting was called to order at 9:10 a.m.

The meeting began without City staff present.

2. Round Table: debrief from Jan. 21 Meeting

CDPPS (Lorne Gale) reviewed a ppt presentation that was previously given to Council on 2012-Dec-17. The presentation provided three options that were proposed in the 2010 EBA Engineering Consultants' report:

Option 1 – Eliminate the seismic hazards by removing the dams;

Option 2 – Conduct seismic upgrades to the existing dams that bring them to a state where they safely impound their reservoirs during and shortly after the design seismic event (possible evacuation of the potential inundation area).

Option 3 – Bring the impoundments into a state where not only do the dams safely impound the reservoirs during and after the design seismic event, but also require minimal maintenance after the event. This will require construction of new dams or extensive improvement of the fill in the existing dams.

This seismic report took a deterministic approach and the dams were classified by number of possible fatalities (e.g. Extreme = over 100 fatalities; Very high = 10 – 100 fatalities; High = less than 10 fatalities. At yesterday's meeting, DSS appeared receptive to lowering the classification of the dams depending on the new approach / risk assessment. GA stated that their interpretation was that DSS may reduce the classification of the dams.

CDPPS asked Golder about their thoughts of the potential “wave” downstream and explained that emergency personnel are stating that a 20 foot wave could compromise the school. Golder said that the findings from the study were very conservative and complete disorgement of the water within 3 minutes was very conservative.

CDPPS discussed the recommendations from the 2010 EBA report, such as construction of a rock fill buttress upstream, increasing the size of the two spillways for both dams and armouring the backside.

GA stated that if the Middle Dam fails and it is buffered by the Lower Dam than the downstream people may not be affected. Stable dams can exist with an “extreme” classification.

CDPPS stated that as long as there is no cascading effect on others, then each dam can be individually considered.

Toby Seward arrived at the meeting.

GA stated that this is the first consideration of dams by DSS to include a risk assessment. This is a test case for DSS and they have to be satisfied that the risk assessment approach is a thorough process with explanation, clarification and possibly a second opinion may be needed.

Dale Lindsay arrived at the meeting.

CDPPS provided a history on this issue and stated that the 2012-Dec EBA report was presented to Council, including the three Options. Klohn Crippen Berger (KCB) engineering and environmental firm studied the options and reported back to Council. Council then directed a 30-day facilitation by Katherine Gordon with City/SFN/CDPPS representatives as KCB’s recommendations were not acceptable by all parties.

CoN stated that since the Canadian Dam Association (Dam Safety Guidelines) were revised last year, DSS is now considering the risk assessment. Timing is the challenge because DSS may take months to review the solution and then we will miss the fisheries window this year to make any improvements to the dams.

Question: Will DSS want to engage an authority to review GA’s risk assessment and if so, it may be beneficial to engage a peer reviewer early who can participate in the GA technical risk assessment workshop? CoN responded that they will contact DSS to ask this question.

Question: Have all options for remediation of the dams been considered? CDPPS referred to a 2013-July report that provided new information such as rebar within the concrete, concrete has been found to be equivalent in strength to current construction standards and bedrock has been confirmed as the foundation for both dams. This report suggested fixing the problem by lowering the water level in the Middle Dam to stop the wall from toppling. To eliminate the cascading failure, then reassess the flooding effect and need to consider improvements then to only the Lower Dam.

In reference to the Upper Chase River Dam, GA stated that overtopping could occur because the culvert size is not adequate to handle the water/flow, so the culverts would need to be enlarged if that is the case, as suggested in previous reviews.

GA stated that remediation options will need to be functional and also retain the ambiance of the park. If the economics are comparable, then the choice will be the one that is most desirable by the community. Will also need to balance the cost factor vs reliability.

Question: Is it feasible to build another structure (dam) below which will then be the one that matters? GA responded that determining a location for a new dam and to build it would take a lot of time. Also it would be a potentially significantly more invasive option.

CDPPS thanked Lorne Gale for everything he has done to date on their behalf and stated that without him the dams would have been removed by now.

Question: Does the probable maximum flood (PMF) need to be reviewed? GA responded that the PMF comes from the probable maximum precipitation (PMP) and is based on a formula. Hydro has done a new study on an earthquake model that is not publicized yet, but DSS is aware of it.

CDPPS provided confirmation of a 2012-Dec email from DSS that states that they will use the best practices of the day to assess the dams.

### 3. Next Steps: action items and responsibilities

Question: What are the next steps and a realistic timeline for risk assessment and options? GA responded that rehabilitation of only the Lower Dam might be a viable option now. By the end of the month they will have preliminary runs on some of the options, but a key component is getting AE engaged and understanding when they may be able to provide their results. Bill Roberds will be providing data on specific flows and downstream impacts / potential loss of life.

Question: What is the fall back if AE can't do work for a few months? GA responded that we are not expecting that. Our hydrologist has indicated that once he has the model then the work can be done rather quickly. If the hydrologist can't do this, then GA will have to build the model themselves. With the data files from AE, GA can handle the runs themselves.

CDPPS advised that another option is a contact at Vancouver Island University (VIU), who has done a study on the Colliery dams and has also created a risk model.

GA stated that they will hold a technical risk assessment workshop on February 18 to look at the status quo for the dams and provide four or five options.

Paul Silvey arrived at the meeting.

CDPPS asked if the workshop will be premature if GA is drilling boreholes on February 18. Golder responded that the workshop can still occur with incomplete information.

Facilitator – Reviewed the Schedule for Long-term Mitigation. The Committee was reminded that there is a further step where DFO and other regulatory bodies may need to become involved. Also want to make sure that efforts to find a permanent solution don't push the schedule back so far that even short-term mitigation cannot occur this summer. Any short-term mitigation has to be streamlined to work efficiently with the permanent "fix."

CDPPS stated that GA shouldn't rush their work in order to report back to the Executive Committee by 2014-Feb-28. Suggested completion of Phase 3 (short-term mitigation plan involving alterations to the dams, if required) by the end of 2014-March.

Question: What is GA's most realistic timeline for developing options including all the information? GA responded that if a design is acceptable to Council, then processes can be run concurrently.

CoN suggested that improving the spillways can be done in 2014.

CDPPS suggested that armouring can be done in short order (4 weeks' time) and this will be seen as doing something by summer, which will answer DSS requirements. GA stated that work can be done by summer as long as the approval process is smooth, DSS' approval is received quickly and that unknown conditions do not trigger another set of requirements that cause delays. The risk assessment will lead to a better understanding and will have an impact on the short-term mitigation plan.

CoN suggested that armouring and reinforcing the embankment could be handled in Phase 1 (review and verify data), with the spillways addressed in Phase 2 (develop options to remediate dams in place).

CDPPS expressed concern regarding public acceptance and understanding that "the most dangerous in BC" may require only minimal work. Golder responded that they would do something. CDPPS said that it was important not to do anything more than was required but that they did need to be aware of the political situation.

CDPPS expressed concern with GA doing unnecessary extra work. GA responded that if remodeling of the Lower Dam is acceptable then we will just proceed with that.

CoN stated that GA's professional opinion is required as to whether it is appropriate to only address the Lower Dam.

GA stated that inundation information is what's missing (hydrology study). We could address the Lower Dam this year and we may not need to do anything to the Middle Dam.

Question: What is the earliest practical date that GA could provide the Committee with a set of options? GA responded that the date is somewhere between the end of February and March, if there are no unforeseen issues.

CDPPS stated that the emphasis is always on work being done in the summer, but armouring can be done within four weeks.

SFN requested the technical recommendations and proof that Allu is a safe and accepted method for soil stabilization. Several options/methods can't be run concurrently because we need to be careful and aware of fisheries, as well as other considerations. Some solutions will have less impact, but not all can be done at any time of the year.

GA stated that it will take more time to run the analysis of subsequent cracking of the core in an earthquake. Depending on the risk assessment, the options may have to be re-visited.

Question: Is the schedule accurate to assume 1 month for tender, 2 months for design and 3 months for construction, so that the work is completed by the fall? GA responded that the goal is to have a design at the end; a complete package. We can try to extrapolate Phase 1, but the concern is that we need to have a good idea of what the complete solution is before going ahead with a portion of the project this year so that any work we do in Phase 1 contributes to Phase 2.

CDPPS stated that money will be saved by working towards a complete process with an end goal now. Suggested reducing the number of signs in the park this year and minimizing the fear in the Harewood community.

Question: What is the process to analyze using earthquake data analysis (EDA)? GA responded that the risk analysis information is needed. We understand there is a political pressure to do something this year, but we don't want to do something that isn't beneficial to the final solution.

Question: Did DSS mandate that signs and sirens be erected in the park? CoN responded that they are part of Council's short-term mitigation plan.

Question: If time is taken to get the best information to plot on the graph, will the curve come down to be in the acceptable range? We would then be at a point where the risk isn't as bad as first thought, which buys us time to discuss further ways to reduce the curve. GA responded that we will include in our design some work that will be done this year, if this is important from a perception point of view.

SFN stated that DSS was not pleased last year to hear that nothing would be done until 2015. The CoN needs to show DSS that progress is being made, but we can't begin work without having all the data first.

Facilitator - DSS will see evidence that a solution is underway and the work is in progress.

CDPPS stated that the community should be advised that given that there is new information, there are less lives at risk.

GA stated that an interim technical risk assessment workshop will provide a sense of what the benefits will be for some solutions. Suggested proceeding with this workshop in early March in Vancouver and include representatives from DSS, AE, Herold Eng., GA, as well as any members of the Technical Committee who wish to attend to observe. Borehole drilling and a true analysis of the core will be required before the workshop is held.

Question: Can the risk assessment be received by the end of March, then run a risk analysis and general solutions with a range of costs by mid-April? GA responded "yes".

Question: How long will it take to receive approval from the City for a remediation plan? CoN responded that the plan can be reviewed by the City Manager within 24 hours and then taken to Council within a week.

Question: Is there money available now? CoN responded that \$2.5 million was approved with a possible \$5 million that will need to be voted on by Council.

Question: Does GA need to give a presentation to Council? CoN responded "no", Council wants to receive a report on options and costs.

Facilitator – It has been suggested that the Committee host a public information session with GA present.

Bill Roberds left the meeting at noon.

Further technical work required

GA stated that soil sampling of the Lower Dam and environmental testing may need to be done because previous sample testing took place in 2009. They may need to bring in other consultants depending on spillway options that may impact fisheries or the environment. CoN and SFN will need to evaluate potential consultants.

Bill Heathcote left the meeting at 12:15 p.m.

Question: Can previous studies be referred to for environmental/fisheries impacts? SFN responded that previous studies will not be reliable from SFN's perspective because they were done without including SFN.

Dale Lindsay left the meeting at 12:30 p.m.

4. Public Information: discussion of options, including Open House concept

This item was deferred to the next meeting.

5. Timeline to making recommendations to Executive Committee

Hydrology and flood remodeling information	First week of February
Onsite drilling and soil sampling GA to prepare data/report and lab testing	First to second week of February Mid to end of February
Dam breach analysis	End of February
GA to hold Technical Risk Assessment Workshop and provide update to Committee	Early March
AE to provide Hydraulics review	End of March
Seismic flack analysis	can be done in up to 4 weeks, but will need investigative work to be completed first
Risk assessment and options, including a range of costs	Early April
Committee meeting to discuss options/next steps (recommendations to the Executive Committee and public information)	Mid-April
Run the Risk Model	Mid- to End of April
Report to the Executive Committee; then to City Council and SFN Council	End of April to Early May

**Agreed: GA will provide to the Committee written confirmation of their timeline.**

**Agreed: GA will provide to the Committee a written progress report on the status of the work by February 28.**

**Agreed: A meeting will be scheduled early in March, including a GA representative, to review the progress report [March 4].**

The Committee will be able to provide a progress report to the Executive Committee after the meeting in March.

6. Next Meeting

Facilitator – Requested the Committee review minutes from the 2014-Jan-09 meeting to confirm the technical information is accurate. The minutes will be brought forward at the next meeting for approval.

A meeting will be held in January without GA to discuss communications/public information and an Open House concept. The Facilitator will prepare a draft public status update after that meeting. **[Confirmed meeting will be held Monday, 2013-Jan-27, at 1:10 p.m., City Manager's Meeting Room]**

7. Conclusion

The meeting concluded at 12:40 p.m.