



ENMAX Power Corporation

Diamond Cove Distribution Line Complaint

February 19, 2010



ALBERTA UTILITIES COMMISSION

Decision 2010-076: ENMAX Power Corporation

Diamond Cove Distribution Line Complaint

Application No. 1518612

Proceeding ID. 181

February 19, 2010

Published by

Alberta Utilities Commission

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**ENMAX POWER CORPORATION
DIAMOND COVE DISTRIBUTION LINE COMPLAINT**

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1 INTRODUCTION AND BACKGROUND

1. In June 2005, flooding eroded portions of the Bow River bank near ENMAX Power Corporation's (ENMAX) Substation #32, which is located south of the Ivor Strong bridge on Deerfoot Trail and across the river from the Calgary Diamond Cove subdivision.¹ The flooding jeopardized the stability of ENMAX's distribution lines 8-32.11 and 8-32.15 when high water levels eroded the soil at the base of three poles near the riverbank. In response, ENMAX was forced to de-energize the two distribution lines and secure the poles in order to minimize the risk of the poles falling over. As a result, ENMAX was required to operate the distribution system around Substation #32 in an abnormal state which increased the risk of service disruption for customers who are served from this part of ENMAX's distribution system.

2. In order to return the operation of the distribution system around Substation #32 to a normal operating state, ENMAX had to rebuild the affected distribution lines. During consultation on rebuilding the affected distribution lines, some Diamond Cove residents expressed concerns regarding the impact that ENMAX's preferred route would have on the stability of the escarpment at the west bank of the Bow River behind their homes. In response to these concerns, ENMAX retained a geotechnical engineering firm, M & B Technical Testing Ltd. (M&B), to assess the impact of the selected configuration on the local slope stability conditions.

3. M&B filed a report to ENMAX on May 2 and 20, 2007 which stated "...it is our opinion that these construction activities should not have a detrimental affect on the existing stability of the escarpment and slope, nor should the proposed work introduce future soil stability issues."² M&B also reviewed the slope stability analysis originally performed in 1988 by Curtis Engineering Associates Ltd. at the time that the Diamond Cove subdivision was initially constructed and stated that in its opinion the analysis remained valid. That analysis concluded that the project area was stable and that the installation of the poles should not have a detrimental effect on the stability of the slope.

4. In a letter dated June 13, 2007, the Alberta Utilities Commission's (Commission) predecessor, the Alberta Energy and Utilities Board (Board), in response to a complaint received from Mr. Peter Morissette, a resident of the Diamond Cove Community, directed ENMAX to file a formal application with the Board for approval to construct and operate the proposed

¹ Exhibit 91.

² Exhibit 20, attachment 8, M&B Report May 2, 2007 page 2.

distribution facilities required to cross the Bow River into the community of Diamond Cove. In the interim, the Board directed ENMAX to suspend all ongoing construction activities.

5. In the complaint received by the Board, some Diamond Cove Community residents expressed concern with the impact that the new ENMAX power poles might have on the stability of the escarpment at the west bank of the Bow River behind their homes. Specifically, they were of the view that there were instabilities on the slope of the escarpment and that the new power poles to be installed by ENMAX would exacerbate this situation and make the embankment unstable.

6. On June 18, 2007, ENMAX filed a letter with the Board, advising that for safety and reliability reasons, it was critical that ENMAX be permitted to continue construction on the Diamond Cove project. ENMAX indicated that its three existing structures on the east bank of the Bow River were close to being in the water and that the additional spring runoff could submerge the structures. As well, ENMAX advised that trenches had been dug along the footpath adjacent to Diamond Cove residences on the west bank of the Bow River and for safety reasons, could not be left unattended. Based on these representations, the Board rescinded its suspension order on June 20, 2007. The Board's direction to ENMAX to file a formal application remained in effect.

7. ENMAX completed construction and the replacement distribution facilities were energized on July 6, 2007. The completed construction involved the power lines crossing the Bow River adjacent to an existing distribution line. The configuration required the installation of two new distribution power poles on the west bank of the Bow River less than 20 metres south and upslope of an existing distribution circuit that had been installed in 1977,³ and the installation of seven new distribution power poles on the east bank of the Bow River.⁴

8. On July 17, 2007, ENMAX filed its application, outlining the need for the project, the alternatives it had considered, and its consultation process. ENMAX stated that with the loss of distribution lines 8-32.11 and 8-32.15 in excess of 35,000 customers were exposed to risk of losing service from a single failure condition.

9. Subsequently, ENMAX advised that there was another pole at risk on the east bank of the Bow River, and that it would have to undertake work to reinforce the east bank of the Bow River in addition to and unrelated to the installation of the replacement distribution facilities on the west bank.

10. In a Commission ruling issued May 21, 2009, the Commission extended the scope of this proceeding to include submissions and evidence on two issues related to the east bank stability work. These issues were: (1) whether the reinforcement of the east bank may further deteriorate damage downriver on the west bank to destabilize the escarpment on the Diamond Cove and (2) the extent to which the east bank poles supporting the river crossing could affect the west bank poles.⁵

³ Transcript, page 128, lines 21-23.

⁴ This configuration is known as Alternative H and is further described in Exhibit 19.

⁵ Exhibit 57.

11. The Commission issued a Notice of Hearing on May 5, 2009. The Notice was mailed directly to residences that were identified as possibly being directly and adversely affected by a decision of the Commission with regard to this complaint.
12. Responses were received from various landowners, namely, Mark Sasges, Laurel Holth, Guy and Riina Huntingford, Peter and Nancy Morissette, and Ted Burgoin (collectively, the Complainants).
13. The Commission held a public hearing in Calgary, Alberta on December 16, 2009, before Vice-Chair Ms. Carolyn Dahl Rees and Commissioners Thomas McGee and Allen Maydonik.
14. It is the position of the Complainants that the new distribution facilities installed on the west bank of the Bow River behind their property have added an incremental stability risk to the slope and for safety reasons, the Commission should direct ENMAX to remove these distribution facilities and relocate them just south of Deerfoot Trail.⁶
15. During the course of the hearing, the Commission received oral statements from additional landowners who lived in Diamond Cove and who were not represented by the Complainants and did not support the position being advanced by the Complainants.⁷ These additional landowners were primarily concerned that a line move could result in a relocation of facilities closer to and negatively affecting them. These landowners stated that if relocation of the lines was required, they should be moved off the ridge.
16. The parties presented oral argument at the close of the hearing and all undertakings were completed on December 24, 2009. Therefore, the Commission considers the close of record of the proceeding for this Application to be December 24, 2009.
17. In reaching the determinations set out in this Decision, the Commission has considered all relevant materials comprising the record of this proceeding, including the evidence and submissions provided by each party. References in this Decision to specific parts of the record are intended to assist the reader in understanding the Commission's reasoning relating to a particular matter and should not be taken as an indication that the Commission did not consider all relevant portions of the record as it relates to that matter.

2 ISSUES

18. The Commission has addressed the following matters relating to the resolution of this complaint:
- a) Nature of Application and Jurisdiction;
 - b) Impact of distribution poles on west bank slope stability; and
 - c) Impact of east river bank stabilization on west bank slope stability.

⁶ This configuration is known as Alternative E and is depicted in light blue colour on Exhibit 91.

⁷ Dave Jerke Transcript page 12 lines 22 to page 14 line 15, Allan Roles page 14 line 21 to page 16 line 17, Joan Petersen page 20 line 15 to page 21 line 21

3 NATURE OF APPLICATION AND JURISDICTION

3.1 Nature of Application

19. As noted above, ENMAX rebuilt the distribution lines in order to provide distribution service and the lines were energized on July 6, 2007. Opposition to the configuration of the replacement lines was received from the Complainants in this proceeding.

20. On March 26, 2009, the Commission issued a ruling in which it clarified the nature of this proceeding.⁸ In its ruling, the Commission stated:

While the Board directed ENMAX to file an application for approval of its distribution facility in the Diamond Cove area, the Commission recognizes that the facilities have already been constructed. Rather than treat this matter as an approval of the distribution facilities, the proceeding will be treated as a complaint application as the fundamental purpose of the proceeding has been and is to address the complaints of Diamond Cove residents. In order to clarify the parties' roles, the applicants to this proceeding are considered to be those residents who take issue with the distribution facility and who are registered as parties to the proceeding, namely, Mark Sasges, Laurel Holth, Guy and Riina Huntingford, Peter and Nancy Morissette, Ted Bourgoïn (collectively the Applicants). ENMAX is the respondent to the application.

21. The Commission confirms its ruling in this regard.

3.2 Jurisdiction to Consider Complaint

22. ENMAX, as part of its argument submission, contended that Commission approval "is not required in order to construct and operate individual elements of an electric distribution system."⁹ As the Commission has determined that this is not an application for approval to construct and operate the distribution facility in issue in this proceeding, the Commission makes no finding respecting its authority in this regard.

23. ENMAX, in its argument submission, has not conceded that the Commission can consider this complaint. Conversely, the Complainants, in their argument submission, contend that "...if it's not AUC's decision who does the public go to? The public cannot go to the City of Calgary as a regulatory body. They're owned 100 percent by-- how are we going to argue with the City of Calgary when an owner is there? There has to be a method or a process for the public to be protected here."¹⁰

24. The Commission considers that it has all necessary jurisdiction and authority to deal with this complaint. The Commission has addressed this complaint as a matter in respect of which it is entitled to inquire or investigate pursuant to the general powers conferred on it by the *Alberta Utilities Commission Act*.

⁸ Exhibit 69.

⁹ Transcript, page 225.

¹⁰ Transcript, page 253.

25. Section 8 of the *Alberta Utilities Commission Act* states, inter alia:

Powers of the Commission

8(1) The Commission has all the powers, rights, protections and privileges that are given to it or provided for under this Act and under any other enactment and by law.

(2) The Commission, in the exercise of its powers and the performance of its duties and functions under this Act or any other enactment, may act on its own initiative or motion and do all things that are necessary for or incidental to the exercise of its powers and the performance of its duties and functions.

26. In addition to the general powers granted to the Commission under the *Alberta Utilities Commission Act*, the Commission has also considered this complaint pursuant to the investigative and supervisory authority conferred on it pursuant to the *Public Utilities Act*.

27. Pursuant to section 85 of the *Public Utilities Act*, the Commission has authority to:

... exercise a general supervision over all public utilities, and the owners of them, and may make any orders regarding extension of works or systems, reporting and other matters, that are necessary for the convenience of the public or for the proper carrying out of any contract, charter or franchise involving the use of public property or rights.

28. As well, section 87 of the *Public Utilities Act* authorizes the Commission, either on its own, or on the application of a person having an interest, to investigate any matter concerning a public utility. Section 1(i) of the *Public Utilities Act* defines a public utility as including an electric utility while section 2 of the *Public Utilities Act* provides that an application under this act includes a complaint.

29. Although not necessary for the purposes of this proceeding, the Commission could also consider this complaint as a rate base matter into which the Commission could inquire and investigate pursuant to the general provisions of the *Electric Utilities Act*.

30. Pursuant to section 102 of the *Electric Utilities Act*, the owner of an electric distribution service must prepare a distribution tariff for the purpose of recovering the prudent costs of providing electric distribution service and must apply to the Commission for approval of its distribution tariff.¹¹

31. Further, and as noted by ENMAX in its argument submission, section 105 of the *Electric Utilities Act* imposes certain duties on ENMAX, including, *inter alia*:

Duties of owners of electric distribution systems

105(1) The owner of an electric distribution system has the following duties:

- ...
- (b) to make decisions about building, upgrading and improving the electric distribution system for the purpose of providing safe, reliable and economic delivery of electric energy having regard to managing losses of electric

¹¹ Section 1 of the *Electric Utilities Act* provides definitions for the following terms used in section 102: “tariff”, “electric distribution service.”

- energy to customers in the service area served by the electric distribution system;
- (c) to operate and maintain the electric distribution system in a safe and reliable manner;

...

32. Sections 121 and 122 of the *Electric Utilities Act* establish the matters that the Commission must consider in approving a tariff application. These include:

122(1) When considering a tariff application, the Commission must have regard for the principle that a tariff approved by it must provide the owner of an electric utility with a reasonable opportunity to recover

....

- (h) any other prudent costs and expenses that the Commission considers appropriate, including a fair allocation of the owner's costs and expenses that relate to any or all of the owner's electric utilities.

33. Although it has not expressly done so, the Commission, as a consequence of its responsibility to ensure that the costs and expenses recovered by ENMAX from its customers for the distribution services it provides are prudent, could consider the complaint brought before it in this context.

3.3 Prudency Test and Standard of Review

34. As the Commission has determined that this proceeding is not to deal with an approval to construct and operate the distribution facilities, the Commission agrees with ENMAX in its argument submission that this proceeding is "in essence, a retrospective review."¹² That is, the Commission will assess the reasonableness of ENMAX's decision to construct and operate the distribution facilities in accordance with the reasonable and prudent standard that the Commission, and the Board before it, has used.

35. In defining what is prudent, the Alberta Court of Appeal in *ATCO Gas and Pipelines v. Alberta Energy and Utilities Board* (2005 ABCA 122) stated:

65 As a standard in public utility regulation, prudence is described as a concept borrowed from legal principles, such as negligence. In other words, the public utility will be held to a managerial duty of care:

What is prudent is deemed to be ascertainable through the reasonable efforts of competent managers with sound and reasonable judgment. That risk is involved in managerial decision making is judicially acknowledged. But, the deliberate exposure to substantial risk in the exercise of managerial discretion is by its very nature imprudent, for risk is to be avoided, if not altogether, at least insofar as possible under the circumstances: *The Prudent Investment Test*, p. 47.

¹² Transcript, page 228.

36. Further, in Decision 2005-120,¹³ the Board discussed the application of a prudence test in the context of a capital deferral account reconciliation application and stated:

In Decision 2001-110 the Board established the following test for prudence at page 10:
In summary, a utility will be found prudent if it exercises good judgment and makes decisions which are reasonable at the time they are made, based on information the owner of the utility knew or ought to have known at the time the decision was made. In making decisions, a utility must take into account the best interests of its customers, while still being entitled to a fair return.

...

Although the Board will start with the presumption, confirmed by the Alberta Court of Appeal, that AltaLink has acted prudently, the presumption can only be confirmed or overturned through an examination of the information and circumstances that were available to AltaLink or that it ought to have known at the time it executed decisions in respect of the direct assigned projects. The Board's prudence review will assess if the actions undertaken by AltaLink were reasonable, demonstrated good judgment, and were undertaken with the best interests of customers in mind.¹⁴

37. ENMAX has argued that it is this standard that must be applied in assessing the reasonableness of ENMAX's decision to construct and operate the distribution facilities in the manner in which it did. The Commission agrees. Consequently, the Commission has reached its decision respecting the complaint by determining whether the Complainants, as the applicants in this proceeding, have demonstrated that the decision made by ENMAX at the time the decision was made and with the knowledge that ENMAX had at that time, was not prudent because its decision did not provide "safe, reliable and economic delivery of electric energy to its customers."¹⁵

4 IMPACT OF DISTRIBUTION POLES ON WEST BANK SLOPE STABILITY

4.1 Views of the Parties

38. To assist the Commission in its determination of the impact, if any, that the new distribution facilities may have on the stability of the west bank, two expert studies were commissioned by ENMAX. These studies were the M&B Technical Testing Limited (M&B) Report, dated May 2 and 20, 2007 and the Golder Associates Ltd. (Golder) Geotechnical Slope Stability Assessment Report, dated October 17, 2008.

39. Mr. O'Connor, who prepared the M&B Report, was engaged by ENMAX to review the 1988 Curtis Engineering report to determine if the geotechnical assessment of that study was still reasonably applicable with respect to the slope stability and the establishment of setbacks. The M&B Report stated that no noticeable indications of instability at the proposed location of the distribution lines were observed and the assessment concluded that the project area was stable

¹³ Decision 2005-120: AltaLink Management Ltd.. Reconciliation of Direct Assigned Project Capital Deferral Accounts for the May 1, 2002 to April 30, 2004 Period (Application No. 1359518) (Released: November 22, 2005).

¹⁴ Decision 2005-120, page 3.

¹⁵ Section 105(1)(b) *Electric Utilities Act*.

and that the installation of the distribution poles should not have a detrimental effect on the existing stability of the slope.¹⁶

40. Golder was retained by ENMAX to conduct a geotechnical slope stability assessment on the project site to assess the stability of the slope where the new distribution facilities were located. The Golder Report concluded that “the overall slope, however, has been generally stable for at least the past 50 years. The area where the power poles are located shows no evidence of instability since the installation of the first set of power poles over 25 years ago.”¹⁷ The Golder Report further stated that the impact of the point loads from the new power poles on the slope stability was small and reduced the factor of safety by no more than 5 to 10 percent for small scale failures.

41. The Golder Report acknowledged that under normal conditions the escarpment was stable, but under the worst case scenario with a high groundwater table, there is the possibility of small scale failures at the power poles. However, the report determined that large scale failures that could affect homes would not occur. The report also stated that the small scale block slides immediately above the Bow River are naturally occurring events caused by the high water level of the Bow River after the 2005 floods and were not connected to the distribution pole installation because the distribution poles are located in an area where the bed rock is high and therefore resistant to erosion caused by increased river water levels.

42. Both Mr. O’Connor on behalf of M&B and Dr. Liu, on behalf of Golder, presented testimony in the hearing regarding the findings in their respective reports.

43. The Complainants considered the new distribution facilities and accompanying construction and installation work had and would continue to negatively impact the stability of the slope of the escarpment and that the stabilization work proposed to be constructed by ENMAX on the east river bank would divert the river flow towards the west river bank, further eroding the escarpment.

44. The Complainants’ primary concern was for the safety of their homes against slope failure. The homeowners along the ridge have restrictive covenants on their property because of potential slope stability problems in the area and are opposed to development which may contribute to slope instability.

45. Although the Complainants did not provide expert evidence to support their position, they were of the view that ENMAX had: (1) not properly assessed the slope stability; (2) had based its reports on incorrect data; and (3) had not selected the best alignment for the construction of the poles. Moreover, the Complainants opined that as the existing poles may be old and approaching the time to be replaced, they could be moved off the ridge along with the new distribution facilities which would provide an opportunity to remove further disturbances from the slope.

46. The Complainants were of the view that photo 14 of the Golder Report showed cracking/small scale slumping under the distribution poles and provided evidence of slope instability, notwithstanding the fact that Mr. O’Connor did not observe tension cracks where the

¹⁶ Exhibit 20.

¹⁷ Exhibit 12.

poles are located when the M&B Report was prepared. When questioned about the possibility of slope instability at the pole locations on the escarpment, Dr. Liu stated M&B could have overlooked these as the mandates of the two reports were different. The M&B Report focused at the location of the distribution poles while the Golder Report looked at the entire slope.

47. The Complainants also indicated photos 9, 10 and 11 of the Golder Report showed significantly greater instability and were concerned the cracking shown in photo 10, directly under the poles, could degrade to the conditions shown in photos 9 and 11. In response to this, Dr. Liu stated that:

the most of slope failure in that part occur in the till, which what we call overburden till material. The till in the sections where photos 9, 10, and 11 are showing, the interface between the till and the underlying bedrock is relatively low. In other words it's about 1 or 2 metres above the current river level – versus the interface of the till and bedrock of gravel where the power poles are, which is a lot higher. So the mechanism which trigger the different type of failure -- of the failure are different in there's two different incidents.

The lower part -- where they run through the large slide you're seeing is predominantly triggered by the erosion of the river at high flood level. At the high flood level the river level come up, go beyond the interface between the bedrock and the till, which caused erosion because the till is relatively -- quite susceptible to erosion, and that's where the land slide occurred. It's triggered by the erosion versus where the power poles are, the interface is a lot higher, therefore you don't see that the same level of erosion on the impact of the land slide, if that makes sense to you.¹⁸

48. Dr. Liu further stated that the tension cracks in photo 14 appear to be caused over time and were not fresh. The small scale block slides downstream from the distribution poles were concluded to be naturally occurring events caused by erosion of the Bow River. Golder found “no connection between the installation of the new power poles and these downstream block slides.”¹⁹

49. The Complainants also questioned the accuracy of the survey data used in the Golder Report. While ENMAX provided the most recent available data, the Complainants were concerned that this data did not represent the changes to the topography after the flooding events.

50. In response to this issue, ENMAX confirmed that the Digital Aerial Survey (DAS) file, obtained from the City of Calgary, and used for the slope stability analysis by Golder, was dated February 2003. The City of Calgary indicated that the contour lines, contained in the February 2003 DAS file, in the area of the power poles, are from 1996 or earlier. ENMAX compared the contour lines from the February 2003 DAS file to a DAS file, obtained from the City of Calgary, dated February 2009, and confirmed there had been no significant change in the area of the power poles.²⁰

51. The Complainants expressed concern with the lower factor of safety presented in the Golder Report, particularly at high groundwater table elevations and questioned whether there was some incremental risk with the installation of the distribution poles. Golder commented that

¹⁸ Transcript, page 106, lines 3-23.

¹⁹ Transcript, page 37, lines 15-16.

²⁰ Exhibit 95.

at a water table elevation of 1030 metres, the calculated factor of safety was 1.04 and as the water level rose, the factor of safety would approach 1.0. Dr. Liu defined the factor of safety as follows “[i]n relation to a slope or embankment, the factor of safety is the ratio of total force available to resist sliding to the total force tending to induce sliding. A factor of safety greater than 1.0 indicates stability.”²¹ However, the Complainants were concerned with a factor of safety for the poles below 1.5, as they have restrictive covenants on their properties referencing a safety factor of 1.5 at their homes. The Complainants are concerned that small scale failures of the poles could deteriorate the safety of their homes on the ridge, bringing the crest of the river bank escarpment closer to the back of their homes and would devalue and make more difficult their ability to sell their homes or could lead to their homes sliding into the Bow River. The Complainants stated that the west river bank has moved further west by 20 to 30 metres since 1991 and if the toe of the escarpment was further eroded by the river then the (entire) slope could fail.

52. The Complainants questioned why 1024 metres and 1027 metres were used in the Golder Report for ground water levels and not something more severe. In response, Dr. Liu explained that 1024 metres is where the current water level is and that this was an appropriate level to establish as a base case, and that the 3 metre increase, which represented a significant rise in water table level, was used to measure the sensitivity of the change. Dr. Liu opined that a rise in the ground water table to this level would most likely have to be caused by steady rain fall over a long period of time. However, since Calgary does not experience heavy periods of rain, the 3 metre rise was seen as very unlikely. Further, even if the ground water table rose to 1027 metres, Golder felt the factor of safety was within a tolerable risk level. It was Dr. Liu’s opinion that as the distribution poles are not dwellings and the probability of failure causing harm to an individual is low, a higher risk can be tolerated.

53. ENMAX also expressed its opinion respecting the factor of safety issue. Since ENMAX has had two other distribution power poles that have been installed for 32 years and have not moved, ENMAX was comfortable with the risk of failure associated with the new distribution lines.

54. ENMAX testified that the City of Calgary’s 1.5 factor of safety requirement did not apply to structures like power poles since the owners are taking on the risk.²² Further, ENMAX advised that it does not have a standard for factor of safety on power poles, but with the exception of the slope issues, these distribution lines are no different from any other and are subject to the same safety requirements, such as ground and water clearance and safety factors for loading, ice, and wind.

55. ENMAX concluded that the calculated minimum factor of safety at the residents’ fence line is 1.5 or greater.²³ The reduction of the minimum factor of safety is only 5 to 10 percent in relation to small scale slope failures near the crest of the ridge, comparable to the natural slopes in the area. The impact of the loads from the new distribution poles for large scale slope failures that could encroach on the residents’ property was insignificant, and if there was a large scale

²¹ Transcript, page 37, lines 22-25.

²² Transcript, page 143, lines 14-25.

²³ Transcript, page 245, lines 14-15.

slope failure that encroached on the residents' property it would not be caused or contributed to by the new distribution lines.²⁴

56. Lastly, the Complainants questioned ENMAX on whether the recommendations of the M&B Report and Golder Report had been adopted by ENMAX. These reports recommended that adequate drainage be maintained and that regular inspections be done. The Complainants stated “[i]t is important to monitor the piezometer and slope at least once a year for tension cracks, and also monitor after heavy rainfall.”²⁵

57. In response, ENMAX testified that during installation of the distribution poles and underground circuits, the compaction specifications for the underground circuits was done beyond the requirements and the grade and condition of the slope was not changed from pre-construction conditions. ENMAX restored the area to the same or better condition after construction was completed. The City of Calgary Parks Department reviewed the completion of construction and approved everything and that it was not ENMAX's mandate to re-slope or re-grade the slope. ENMAX further confirmed that the poles and trenches were at least 8 metres from the edge of the escarpment and followed the setback recommendation of the Curtis Engineering report.

58. ENMAX advised that inspection of the slope and piezometers had been performed and that no significant changes to piezometer readings were observed. ENMAX stated it expects to start regular monitoring annually and during the spring runoff period beginning in 2010, in response to the recommendation presented in the Golder Report.

59. ENMAX stated that the issue to be determined was whether the two additional distribution power poles have a material impact on slope stability and not whether the slope is stable. The Golder Report shows that the additional distribution poles do not have a material impact on slope stability. Rather, the primary driver of slope instability is the high water level of the Bow River. This is a natural event that would occur regardless of the installation of the distribution poles. “The simple fact of the matter is that in this area the mechanics of erosion is related to river flow and consequently to water levels. If the Bow River flows increase significantly so that the water level reaches above the bedrock to the exposed till on the west bank, there will be erosion. This erosion will occur whether or not the new poles are on the ridge and whether or not the east bank is stabilized.”²⁶ Moreover, there are two existing poles from 1977 which have been stable for a long time and as the new poles have been installed 11 metres and 17 metres south (upslope) of these existing poles, they should be stable as well.

4.2 Commission Findings

60. The Commission considers the following factors to be determinative respecting the impact that the addition of the distribution poles on the west escarpment has had on the stability of the west bank slope: (1) the uncontroverted expert testimony of Dr. Liu respecting the conditions that must be present to create instability of the slope through a change in groundwater table levels; and (2), the indisputable fact that there are two distribution poles that have been stable for the past 32 years that are located 11 metres and 17 metres north (downslope) of the

²⁴ Transcript, page 246, lines 1-4.

²⁵ Transcript, page 88, line 22.

²⁶ Transcript, Page 251, lines 11-18.

new poles. It was the evidence of ENMAX that although the new distribution poles are slightly higher, they were installed using the same method as the older distribution poles that were installed in 1977, the poles were anchored similarly, the soil conditions are the same and they both carry similar loads.²⁷ Finally, ENMAX testified that it had no record from past line patrol observations that there was any evidence of stability problems respecting the old poles.²⁸

61. The Commission considers that it would be unlikely for conditions to exist that would cause the groundwater tables to rise 3 metres and does not find to be imprudent the decision of ENMAX to assume any related risk of slope instability as it relates to its decision to locate the new distribution facilities.

62. The Commission acknowledges the Complainants' concerns for the safety of their property. However, no direct evidence was provided to support their position and to counter the expert evidence provided by ENMAX. The Commission accepts the evidence presented by ENMAX that if large scale failure occurs the cause of such failure would be the result of natural causes such as rising river levels, and not as a result of the installation of the new distribution facilities on the west bank.

63. The Commission notes ENMAX's evidence that the factor of safety at the Complainants' fence line will remain at 1.5 or greater.²⁹ Should the Complainants continue to be concerned about the stability of the slope and this factor of safety, the Commission would direct the Complainants to discuss these concerns directly with the City of Calgary.

64. The Commission considers the recommendations for ongoing monitoring found in the Golder Report to be of value and directs ENMAX to file with the Commission for review and approval by September 1, 2010, a detailed instrumented geotechnical stability monitoring program for inspection of the slope annually and during the spring runoff period to ensure the continuous operation of the power system and to monitor the groundwater table in the standpipe piezometers.

5 IMPACT OF EAST RIVER BANK STABILIZATION ON WEST BANK SLOPE STABILITY

5.1 Views of the Parties

65. ENMAX retained Westhoff Engineering Resources (Westhoff Engineering) to conduct a hydro-technical assessment to recommend river stabilization measures on the east bank and to outline the effects that these reinforcements would have, if any, on the west bank.³⁰

66. Mr. Weshoff, on behalf of Westhoff Engineering, presented testimony in the hearing respecting the findings in the Westhoff Engineering Report and concluded in his opening

²⁷ Transcript, pages. 129-103.

²⁸ Transcript, page 156.

²⁹ Transcript, page 245, lines 14-15; Exhibit 12, page ii, paragraph 4.

³⁰ Exhibit 78, Bow River Bank Stabilization Project at ENMAX Power Corporation Substation #32 dated November 2009.

statement that the “recommended measures will have negligible impacts on the west bank of the river compared to current conditions.”³¹

67. The Westhoff Engineering Report recommended the use of vegetative rip-rap and alignment of the reinforcement to minimize the hydraulic effect on both banks of the Bow River.³² Mr. Westhoff testified that without protective stabilization measures the east bank in the project area would continue to erode, eventually threatening all of ENMAX’s facilities in the area.³³

68. The Complainants argued that the need for stabilization of the east bank was clear from the beginning and that the existing alignment should not have been selected if ENMAX knew work would have to be done in future. The Complainants stated that discussions regarding stabilizing the east bank were occurring between ENMAX and the City of Calgary prior to construction of the rebuilt distribution lines. Further, in response to questioning by the Complainants, ENMAX acknowledged that it was aware of erosion problems on the east riverbank in 2005 and that the City of Calgary had taken steps to protect the bank from erosion, but these protective measures had failed and further protection measures were now required.³⁴ It was the position of the Complainants that the two projects were related, or at least impacted on each other, and should have been considered in that fashion.

69. The Complainants were concerned about the reliance that should be made on the conclusions reached in the Westhoff Engineering Report as it was their view that the calculations and modeling may have been based on old data. Thus, even if the calculations were correctly done, if the data used in the calculation was suspect, then the conclusions in the report were of limited value. In response to the questioning by the Complainants on this issue, Mr. Westhoff testified that 3 topography sources were used with dates of 2008, 2009 and one from the City of Calgary that was unknown. Further, Mr. Westhoff testified that the model was highly accurate as it was calibrated using real data (2005 floods) and very recent topography to eliminate as many errors as possible. Mr. Westhoff stated that in a 1:100 year flood, where water levels could be between 1.5-2 metres over the ground, the accuracy of the conclusions reached in report would be within 10 cm. ENMAX submitted the data provided by the City of Calgary was dated February 2003. “The City of Calgary indicated that the contour lines, contained in the February 2003 DAS file, in the area of the power poles, are from 1996 or earlier. EPC has compared the contour lines from the February 2003 Digital Aerial Survey (DAS) file to a DAS file, obtained from the City of Calgary, dated February 2009, and confirms there has been no significant change in the area of the power poles.”³⁵

70. The Complainants also questioned whether reinforcement of the east river bank would divert river flow into the west bank, further increasing erosion on the west bank. The Complainants argued that even if the increase in pressure on the west bank is small after the east bank reinforcement, there would still be some additional pressure on the west side and it was already worse then it was ten years ago. In response, Mr. Westhoff stated that in his opinion, the west bank could continue to erode but that this erosion would be due to high water levels and

³¹ Transcript, page 39, lines 15-16.

³² Exhibit 78, pages 15, 19-23.

³³ Transcript, page 248, lines 12-15.

³⁴ Transcript, page 76.

³⁵ Exhibit 95.

would not be caused by the east bank reinforcement. Even with the reinforcement measures installed on the east bank, the west bank will not see a significant increase in the sheer stress it currently experiences.³⁶

71. Mr. Westhoff added that historical records indicate that the west toe is very stable, and therefore the distribution poles should be stable as well and that erosions will happen if the river level rises above the bedrock and into the till. He explained that in high flood scenarios the river would rise over top of both the east bank and the stabilization berm. In this case the water level may be high enough to saturate the clay till zone above the bedrock and gravel at the base of the slope in the region beneath the power poles on the west bank, thereby causing failure of this clay till zone. It is this failure of the clay till zone that induces the small scale block type failures at the toe of the west river bank immediately above the bedrock. This opinion is supported by that of Dr. Liu and demonstrates that the location of the power poles has nothing to do with the block failures that occur at the toe of the slope beneath the power poles.

72. ENMAX maintained its position that the east bank work was unrelated to the west bank work. The east bank reinforcement would have to be performed regardless of the west bank, as the existing circuits and substation are at risk and the most immediate at risk structure was not part of the re-constructed line. The structure at risk is a pole on the east bank that has been reinforced by steel beams down to the bed rock and although it will be stable for a long time, however, it is now inaccessible from a maintenance point of view because it is currently right on the edge of the riverbank.³⁷ In summary, ENMAX testified that Substation #32 had been in place since 1967 and the distribution circuits had been in service since 1973. There was little evidence of erosion prior to the 2005 flood, and stabilization of the east bank was required regardless of where the re-built distribution lines would go.

5.2 Commission Findings

73. As noted above, the Commission's consideration of the east bank stability work as it related to the complaint is restricted to considerations respecting whether the reinforcement of the east bank may further deteriorate damage downriver on the west bank to destabilize the escarpment at Diamond Cove, and the extent that the east bank poles supporting the river crossing could affect the west bank poles.

74. The Commission considers the expert testimony of Mr. Westhoff to be persuasive. No expert evidence to counter ENMAX's position was provided by the Complainants. Regardless of whether ENMAX knew of the stability issues impacting the east bank, it was the clear evidence of Mr. Westhoff that the east bank reinforcement work will not impact the safety of the distribution poles or the stability of the west bank slope. The work done to reinforce the east river bank is required to protect all ENMAX assets on the east river bank and not only the distribution poles that are the subject of this proceeding. It was reiterated that the trigger for failure of the west bank would be river levels rising above the bed rock and not due any increases in sheer stress from the east bank reinforcement. ENMAX's evidence indicated that the increase in sheer stress on the west bank is insignificant. The protective measures effectively maintain the status quo.

³⁶ Transcript, page 123-124, lines 25, 1.

³⁷ Transcript, pages 158-159, lines 24-25, 1.

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75. The Commission considers that all evidence on record supports a finding that the proposed east river bank reinforcement south of the Ivor Strong bridge on Deerfoot Trail and across the river from the Calgary Diamond Cove subdivision, and the addition of the distribution structures on the west escarpment adjacent to the Diamond Cove subdivision, will not result in a negative incremental effect on the stability of the slope on the west side of the Bow River at that location.

76. The Commission will not disturb the decision made by ENMAX to restore normal operation of the distribution system in the manner in which it did.

77. The Commission directs ENMAX to file with the Commission a detailed instrumented geotechnical stability monitoring program for the slope inspection as further described in paragraph 64 of this Decision.

78. The complaint is dismissed.

Dated on February 19, 2010.

ALBERTA UTILITIES COMMISSION

(original signed by)

Carolyn Dahl Rees
Vice-Chair

(original signed by)

N. Allen Maydonik, Q.C.
Commissioner

(original signed by)

Thomas McGee
Commissioner

APPENDIX 1 – PROCEEDING PARTICIPANTS

Name of Organization (Abbreviation) Counsel or Representative (APPLICANTS)
ENMAX Power Corporation (ENMAX) D. Nering
T. Burgoin P. and N. Morissette M. and L. Sasges

APPENDIX 2 – ORAL HEARING – REGISTERED APPEARANCES

Name of Organization (Abbreviation) Counsel or Representative (APPLICANTS)	Witnesses
ENMAX Power Corporation (ENMAX) D. Wood M. Synott	K. De Jaegher M. Windsor A. Van Dijk D. Westhoff B. Liu M. O'Connor
P. Morissette, T. Burgoin, M. Sasges P. Morissette	P. Morissette
D. Jerke	
J. Petersen	

<p>Alberta Utilities Commission</p> <p>Commission Panel C. Dahl Rees, Vice-Chair N. A. Maydonik, Q.C., Commissioner T. McGee, Commissioner</p> <p>Commission Staff C. Wall (Commission Counsel) V. Choy K. Gladwyn E. Mahadeo</p>
